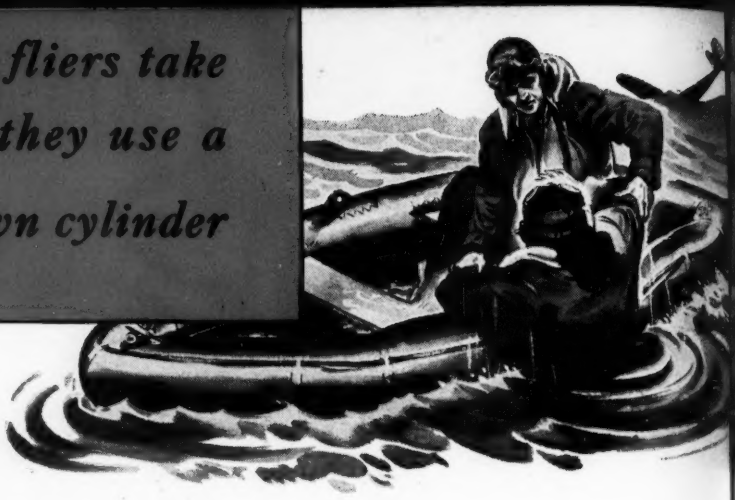
BUTANE-PROPANE News

25¢

FEBRUARY 1943

When fliers take to boats they use a deep-drawn cylinder



This cylinder is only one of many and varied Hackney deep-drawn shapes now in active war service. Not only does deep drawing assure an improved product, but it also effects considerable savings in material, man-hours and equipment.

Fliers forced down at sea use a deep-drawn cylinder to inflate rubberized boats which keep them afloat until rescued. The inflation is accomplished by compressed carbon dioxide stored in the deep-drawn "lightweight" cylinders.

L-P Gas Cylinders Yesterday—and Tomorrow

The above description is of a Hackney product now being used extensively in the war effort. Products such as these are demanding all of Pressed Steel Tank Company's facilities. Consequently, like so many other products, Hackney L-P Gas Cylinders, long preferred in the industry, have to wait while Hackney—with the rest of America—directs its energies toward the successful conclusion of the war.

And when that long-awaited day arrives, the experience gained by Hackney in the war will be reflected to your advantage. All the knowledge learned in producing new products, the use of new materials—all the research instituted in the search for new solutions—will mean better, higher quality L-P Gas Cylinders for you.

Pressed Steel Tank Company

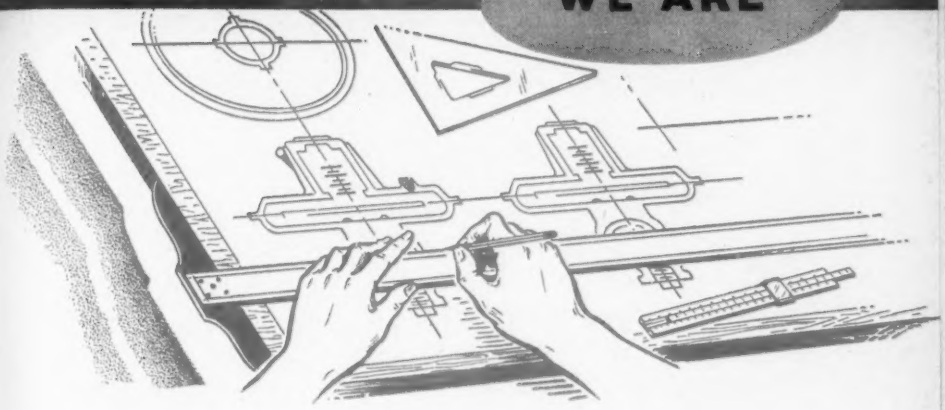
GENERAL OFFICES AND FACTORY · 1487 SOUTH 66th STREET

Milwaukee, Wisconsin

CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

THINKING ABOUT TOMORROW?

WE ARE



THE wonders of tomorrow will come from the germ of today's genius. Under the feverish pressure of war, developments are taking place that, in less strenuous times, might have required years to realize. Already, technically speaking, our pre-Munich world is an antiquity. The LPG world of tomorrow, too, will benefit from the effects of this precedent shattering impulse.

The Engineering, Research and Development Departments of the Pittsburgh Equitable Meter Company and Merco Nordstrom Valve Company are thinking ahead of the times. On the drawing boards new designs are taking form. In the laboratories experimental models are being put through their paces. With the Victory and a return to normal times, the results of today's research will be apparent in tomorrow's EMCO LPG Meters, EMCO Regulators, Pittsburgh Liquid Butane-Propane Meters, and Nordstrom Lubricated Plug Valves.

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EMCO METERS AND REGULATORS • NORDSTROM LUBRICATED PLUG VALVES • PITTSBURGH LIQUID METERS

BUTANE-PROPANE *News*

Reg. U. S. Pat. Off.

Contents for February 1943

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NEW TORCH *for* SHRINKING STEEL PLATES

☆ **HERE** is Ransome's latest contribution to the war effort . . . a refractory lined torch . . . in reality it's an inverted furnace which operates on Propane and air, confining the intense heat to a 4 inch circle. There are four orifices in the shell for the escape of the products of combustion.

Because none of the heat generated is dissipated, but confined to a small area, this torch is not only fast in operation, but is much more economical than other torches employing oxygen. We solicit inquiries from shipyards and steel fabricators who have shrinking and quenching problems.

RANSOME COMPANY

Designing and Constructing Engineers

4030 HOLLIS STREET · EMERYVILLE, CALIFORNIA

Ransome

LETTERS

Gentlemen:

Recently we have had about 20 freeze-ups on propane gas. On some of them we have changed regulators which seems to have helped and in some cases we had to change tanks. However, we have checked on these tanks that we took back and found that all of them were filled around September, 1942.

Since we keep quite a few tanks in reserve, we evidently overlooked to take them out first in use, therefore would you be kind enough to tell us whether gas filled during the summer months is any different from gas filled in the winter months, and would that have something to do with the freeze-ups?

M. G.

New Jersey

If you mean by "freezing up" that service was discontinued due to the formation of hydrates in the regulator, the cause of this is moisture in the propane.

This moisture can be accounted for by a small amount of water left in the cylinder after testing, moisture in suspension in the fuel from the source of supply and even moisture that might get into a cylinder if left with the valve open when empty, allowing air containing moisture to breathe in and out with change in temperature.

Propane with a slight amount of moisture in it will often give no trouble in the summer time as the atmospheric temperature is high enough to melt any hydrates that tend to form in the regulator. In the winter, with the load heavier and the atmospheric temperatures below the temperature of hydrate formation, trouble will be experienced with propane containing only the slightest amount of water.

Propane and water normally do not mix. However, propane has the ability to carry a slight amount of water in suspension. This ability is greater with an increase in temperature and less with a decrease in temperature. As a consequence, fuel purchased and bottled during the warm months might contain a slight amount more moisture than the propane produced in the winter time. This might account for some of your difficulty, although the fundamental reason is that, by some cause, a slight amount of moisture is in your fuel and the combination of load and atmospheric conditions are the main causes of your trouble.—Ed.

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Gentlemen:

We have been advised by the Philgas Co. of 80 Broadway, New York City, to communicate with you in an effort to obtain the proper information regarding butane gases.

Will you kindly forward us any folders which describe butane gases and the hazards connected with the use of them.

Wm. H. McLaughlin
State Safety Consultant
Federal Works Agency
Works Projects Administration
70 Columbus Avenue
New York City

Because of your title as State Safety Consultant, we are inclined to believe that the information most valuable to you could be obtained from Pamphlet No. 58 of the National Board of Fire Underwriters, free copies of which can be obtained from National Fire Protection Association, 85 John St., New York City.

We publish "Handbook BUTANE-PROPANE Gases" which contains much information on fire accident hazards in the industry.—Ed.

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Gentlemen:

In the January issue of BUTANE-PROPANE *News* (Page 27) you have an article on OPA pricing.

We buy our fuel from a southern California supplier and during last February and March they raised us

on the wholesale cost and we in turn reconstructed our prices as of March 31, although the actual change did not take place until April, 1942. Some one complained up here to the OPA and they in turn called us into their office. They told us we could not use the March ceiling prices but had to go back to Oct. 15, 1941, ceiling prices. When we raised our prices we did so with the understanding from our supplier that as soon as they could get the matter straightened out with the OPA there and the refinery rebated them the raise, they in turn would rebate us and we would rebate our customers. Now OPA tells us that we cannot rebate to our customers but must go back to Oct. 15, 1941, prices and make the rebate to the Government as a donation to the war effort. So far we have sat pat and are waiting for the distributor to get the thing ironed out with the refinery and the OPA in Los Angeles. Can you give us any light on this matter? We do not want to do anything wrong but do want to be satisfied all the way around. Our customers ask us each time that we fill them when they are going to get their rebate and if we have to give same to Government where will we be if the customer, too, demands it? After all, the customers are the ones that really are entitled to the rebate.

If you can give us any light on this matter and if we do not have to go back to Oct. 15, 1941, ceiling prices we certainly will appreciate it.

J. A. B.

California

The prices referred to in our January issue apply only to services rendered, not to fuel.

It is true, according to statements made by the War Production Board, that the prices of liquefied petroleum gas were frozen as of Oct. 2, 1941, for certain districts and for remaining districts the maximum prices go back to a period 60 days prior to Oct. 15, 1941.

We discussed this a short time ago with the local office of the WPB and find that there has been no change in that original order.

We do not know of any authority which granted your supplier the right to advance the price of fuel to you.

Neither do we know what the official ruling is as regards refunds to customers by you, or refunds from the supplier to you, but insomuch as this is a very vital point with you we think you should take it up directly with Washington, unless you can get a definite statement from the members of the Los Angeles WPB office.

The original price ceiling of LP-Gas was designated in Amendment 14, of Price Schedule 88, dated Feb. 2, 1942.—Ed.

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Gentlemen:

Herewith find enclosed money order amounting to $7.50 for which I wish to order a copy of Handbook BUTANE PROPANE Gases, Third Edition, the price of which I understand is $5.00. Please apply balance of money order to my account in the renewal of subscription for BUTANE-PROPANE *News*.

I wish to say that it is with particular interest that I read BUTANE-PROPANE *News*. I consider it an asset to the entire LP-Gas industry as a whole. You certainly are doing a good job of keeping your readers informed on the current situation of the butane business. Also, one can find the answer to many technical problems pertaining to the engineering end of the business that arise from time to tme.

Wishing you a happy and successful New Year, I am

Very truly yours,

C. E. N.

New Mexico

Thank you for your orders. We hope our publications will continue to serve you.—Ed.

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● **BUTANE-PROPANE *News* welcomes letters from our readers, but it must be understood that this magazine does not necessarily concur in opinions expressed.—Editor.**

H. F. MILLER
Guest Editor For February

What of 1943?

By HERBERT F. MILLER

Manager, Marketing Department, The Carter Oil Company, Tulsa, Oklahoma

WITH the advent of the second year of our Country's entry into the war to abolish despotism, it is well to reflect upon the liquefied petroleum gas industry's contributions to the war effort. Probably in no other branch of the petroleum industry has the challenge to satisfy defense requirements been met with less disruption to the ever vital necessity of supplying domestic consumers than in the liquefied gas section, and this has been accomplished by the ability and readiness of the industry to apply greater technical skill and increased efficiency to the manufacture and distribution of its all-important products.

Not to be overlooked as a contributing factor in assisting the industry to meet the increased demands upon it during 1942 was the existence in the early part of the year of scattered surplus manufacturing capacity which, at the outset of 1943, we find to be taxed to the limit to meet current demand. A substantial increase in 1942 sales volume and an inevitable further material increase in demand from all sources, and particularly for defense requirements in 1943, will very likely tax to the utmost available transportation facilities. Thus it is essential that the very close cooperation which has existed between manufacturers, transportation factors and distributors in the past months be extended so that domestic consumer appreciation of the difficulties which may confront the industry in 1943 is aroused, and in this, the distributor must play the most important part.

Recognition of the interdependence of each branch of this vital industry upon the other branches prevails today in a higher degree than ever before, thus insuring the attainment of maximum results in the common cause in the year to come.

MAINLY BEYOND THE MAINS

By ELLIOTT TAYLOR, Washington Editor

Official News

Our own and other reviews, previews, prophesies and prognostications notwithstanding, we commend to the thoughtful consideration of the entire LP-Gas industry the statements made by Paul Raigorodsky, assistant director of PAW's Natural Gas and Natural Gasoline Division in his recent address before the Compressed Gas Manufacturer's Association in New York. We commend them first of all because they represent the studied opinion of one of the most brilliant individual technologists in the natural gasoline industry, and because they must also be assumed to be the product of the best information presently available to the war agency with which he is associated.

ELLIOTT TAYLOR

Our modest estimate of slightly over 600,000,000 gallons as the amount of LP-Gas marketed in 1942 is considerably dwarfed by the figures of Mr. Raigorodsky, who sees the present output totalling 50,000 barrels per day —or a gross of over 766,000,000 gallons per year for applications other than the quantity used in the manufacture of motor fuel. This figure is in turn dwarfed by this authority's estimate of the potential available daily capacity of butane alone, which he sets at 400,000 barrels or nearly 17,000,000 gallons. This almost unbelievable amount of butane represents a potential capacity for a single day that is over seventy-five times as great as the grand total of all LP-Gases marketed during the entire year of 1922, when the industry first started.

That some at least of this increased potential will be tapped in the course of the prosecution of the war is indicated by his statement that "new equipment will be required to stabilize and transport the additional amount of liquefied petroleum gas for war programs, but the increased production . . . will be desirable and efficient and in no way penalize war production work." This, of course, is consistently in line with the farsighted policy of the Petroleum Administrator, himself, who has from the outset, and often at the cost of much unjust criticism, held to the view that desirable expansion of all fuel delivery facilities

is necessary to the ultimate effectiveness of the war production program.

That there is currently neither the disposition nor the necessity to curb the use of LP-Gas for essential civilian as well as war purposes is found in the conclusion of Mr. Raigorodsky that, "with a modest expenditure of new critical material it may be safe to state that today a much greater amount of LP-Gas can be made available as a raw material for the liquefied petroleum gas industry and the synthetic rubber and aviation fuel programs." Too often in the past, discussions of the role of LP-Gas in the war have taken the position that the gas as a fuel is in violent and selfish competition with the demands being made for it as a component of artificial rubber and high octane gasoline.

For the immediate future Mr. Raigorodsky recommends immedate action on the part of the industry to adjust itself to the conditions that will prevail during 1943 and for the duration of the war. These recommendations, prefaced in each instance by the circumstances that dictate them are as follows:

1. Tank car deliveries. The number of tank cars available for use by the industry will decrease during 1943, and the withdrawals of cars from LP-Gas service may be without any preliminary warning. To offset these withdrawals the industry must perfect methods to speed up turnaround. Transportation experts in PAW believe that tank car deliveries of LP-Gas can be increased 50%, presumably with the equipment now in operation. If this is so, cooperation from within the industry should insure normal operations even when considerable numbers of cars are no longer available for industry service.

2. Expansion. Industry expansion along normal lines will continue to be impossible with new installations restricted to strictly war related projects. Approval, it is predicted, will be forthcoming only when no other source of fuel is available.

3. Coordination of operation. "Present storage and transportation equipment should be pooled and movements coordinated to allow for the handling of a maximum of liquefied petroleum gas with a minimum of time, labor and critical material. . . . The problems . . . can only be solved by complete cooperation between all companies wherever possible."

4. Storage. "The storage facilities of liquefied petroleum gas must be expanded and so arranged that these products may be quickly and safely stored to eliminate any delay whatsoever in the return of tank cars to active service . . . In these operations critical material will be required . . . this industry must endeavor to make use of second hand and reclaimed equipment." Expansion of industry storage

facilities, in our opinion rests now, not with the willingness of the industry to undertake them, but with the willingness of WPB to allow the use of the necessary critical materials to make such new construction possible. We may anticipate that once the LP-Gas unit is transferred from WPB to PAW the requests for any materials needed for necessary new storage facilities will be pressed with the same intelligent vigor that has characterized other PAW demands for needed construction.

In concluding his advice and recommendations to the industry, Mr. Raigorodsky takes the occasion to observe that now is "an excellent time for the industry to concern itself with studies designed to perfect the operations as well as the economics of the liquefied petroleum gas business." Having voiced precisely these sentiments in times past, we are thoroughly in agreement with this authority when he says that "now is the time for the industry to get its own house in order so that it may be ready when this gigantic struggle is ended to really take its place in the fuel picture of the nation."

We believe also that the pledge of Secretary Ickes, made when he assumed his duties as Petroleum Coordinator for Defense, that no industry would be allowed to gain a competitive advantage over another as a result of war dislocations, has been and is being kept. This, coupled with the encouraging and almost optimistic outlook revealed by Mr. Raigorodsky, augurs well for both the immediate and the distant future of LP-Gas.

Corrections and Additions

In our annual survey, "1942 in Review" in the January issue of BUTANE-PROPANE *News*, we are pained and chagrined to observe that our processes of simple addition are being slowly undermined by the effect of the all-out war effort. Thus the total LP-Gas sales in gallons for 1942 was printed as 604,588,000, whereas the figure should have read 603,484,000.

LP-Gas range sales for the first six months of last year have also been tabulated, the total being approximately 38,500 units, or 7% of the total of 550,000 gas ranges for all types of gas ranges sold in that period. This is a drop in LP-Gas range percentage from 15.5% for all of 1941, reflecting the effect of early limitation orders at a time when stove manufacturers were still well stocked.

The leading cylinder manufacturers have long since turned their attention to the making of shells and bombs and other items of a lethal nature but indications are that the total LP-Gas cylinders manufactured during 1942 was approximately 55,000, as compared to 430,000 for 1941, a decrease of so many percent that we have neither the will nor the fortitude to make the computations.

Central Heating With LP-Gas

By F. K. WOODRING
Clearwater, Florida

MANY LP-Gas dealers believe that they are in the small business class. They confine their efforts to the kitchen load and small heaters. They see the quick profits from the sales of merchandise, rather than their opportunity to build a staple, permanent and profitable income from fuel sales. They wear out their equipment and use up their servicemen's time on customers who call for 10-gallon deliveries. They are good salesmen and work hard selling appliances; but while they are doing that, they see the coal and fuel oil dealers collect more from their customers for one delivery than they get for all the fuel they deliver in two years.

In a large part of this country, liquefied petroleum gas, as a fuel for central heating equipment, has more advantages over fuel oil than fuel oil has over wood or coal. In such localities the distribution of LP-Gas should produce sales and profits equal to those of any utility serving the same territory, and that is seldom classed as small business.

Yes, in most localities 1000 B.t.u. in LP-Gas will cost more than in fuel oil, and in fuel oil they do cost much more than in coal; but that is not the comparative answer as to heating costs. In the first place, better than 80% of the B.t.u. contained in LP-Gas will be converted into useful heat by a boiler or furnace designed for its use, and that efficiency will be maintained throughout the life of such equipment; whereas, oil-fired equipment might start the first day it is used at about 60% and decrease each day as the accumulation of soot on the heating surfaces increases.

That accumulation of soot also tends to give the oil-fired equipment a comparatively short life. Then there are the items of damage to furnishings, interior and exterior decorations to be considered in the cost of heating, when soot and smoke producing fuels are used, to say nothing of the additional cost required to furnish a suitable location for such equipment and the service needed to keep it in operation.

Big Sales Count Most

Some persons, if sold on its advantages, would buy and enjoy the comforts, conveniences and service of a Packard car, but could be sold a Ford, if not shown the Packard. If the same salesman sold both cars, he would lose several hundred dollars in business every time he made the mistake of selling a Ford to the prospect who could have been sold a Packard. The same applies to the LP-Gas dealer who

sold a hundred dollars' worth of spot heaters to the customer who would have purchased a central heating system, if the dealer or his salesman had properly presented it.

That is not all. Those spot heaters will make the customer realize that better heating can be had. This result has often been demonstrated when, after one or two seasons' use of the spot heaters, some progressive oilburner or stoker salesman would come along and sell that customer a six or eight hundred dollar central heating system. That was not the worst of it for the LP-Gas dealer. Without the heating load he did well to sell that customer twenty dollars' worth of fuel per year, with very little reduction in the delivery expenses, and a constant feeling that the customer might become vulnerable to the sales arguments for an electric kitchen.

The public is willing to pay for convenience or anything that will do a job better than it is being done. That is why almost every home has a vacuum cleaner which cost more than fifty times the price of a broom. Or take the gas heaters of the early '90's, which usually consisted of an open burner mounted on a frame and sold for about two dollars. Those old heaters gave as much heat from a given amount of gas used as can be obtained from any heater built today. There was no wear-out or burn-out to those heaters, but today, even the OPA could not find one. The reason is not that the public found less costly heaters, but it has found heating equipment that will, much more conveniently, do a far cleaner,

Home of Senator Elleebe, Marion, S. C., heated by a butane furnace located on the second floor of this modern house.

more comfortable, and safer job of heating, as well as providing improved health conditions for the persons using it.

Years ago the public found properly located, steam heated radiators more convenient and comfortable than draft producing fireplaces and stoves. Rooms so heated are more comfortable, because the steam radiators are located under windows and at other points where cold air enters the room, or is generated. By being so located, the radiators warm the cold air before it moves over the floor. When a stove or fireplace is used, the cold air usually has to move over the floor to the source of heat before it can be made comfortable.

Steam Radiator Is Discussed

Compared to modern, forced air heating systems the old steam heated, castiron radiator has some shortcomings. It requires floor space; it is slow in action; it becomes so hot that it carbonizes dust particles which come into contact with it, thus soiling walls, furnishings, etc.; it reduces humidity and produces air stratification with much heat useless above the occupants. Even at that, many old steam jobs now in use can be made to provide excellent loads for LP-Gas by the installation of a boiler designed for the use of such fuel. This is especially true for schools, churches and other buildings used intermittently. An example of such an installation, is one made by the Home Gas Co., of Moultrie, Ga., in the Colquitt county court house. There a coal fired boiler was replaced by an 800,000 B.t.u. steam boiler, designed to use butane as fuel. The change was made primarily to secure cleanliness for the outside of the court house and neighboring buildings as well as to gain the advantages and comfort of automatically controlled heat. The 1941-42 heating season required 4797 gals. of butane. The previous season, the building was seldom comfortable as it would be either too hot or too cold and 66 tons of coal at $6.50 per ton were used. In addition, labor was required to handle the coal and ashes, storage space for both had to be provided and at the end of the season, the cleaning and repainting bills were convincing proof that LP-Gas is the more economical fuel.

For the person who wishes to heat a home with radiators, hot water offers several advantages over steam. A basement is not required for the boiler location; the temperature of the water can be maintained low enough to avoid damage to interior decorations and with automatically controlled, mechanical circulation, very quick response can be had when the thermostat is satisfied or calls for heat.

The Use of Forced Air

By the use of forced air through suspended unit heaters or projectors, the effectiveness of most steam and hot water heating systems in commercial and public buildings could be much improved. Stratification of the air would be overcome, and at small cost the temperature in each room could be automatically controlled, thus saving fuel and providing greater

Home of W. L. Adams, Sarasota, Fla., which is heated by a propane gas air conditioning furnace. The 28x40 ft. living room is uniformly heated and free from drafts. The return air is taken through four floor grilles located next to the outside walls, and the warm air enters the room through four registers located in the inside wall, 10 ft. above the floor.

comfort. Whenever an LP-Gas boiler is to serve an old installation, in addition to making certain that the piping is placed in good condition, it would also be well to have the customer consider the use of projectors or unit heaters in rooms with very high ceilings.

Gas—natural, artificial or liquefied petroleum—has a half-dozen exclusive advantages, over other fuels, for use in an automatically controlled furnace. It burns completely without producing smoke, soot or ash, making it the cleanest fuel. It requires no mechanical or manual handling. It requires no mechanical or thermal device to prepare it for combustion. It can be used in any part of a building, including the attic. Being the most efficient fuel, it requires a smaller vent, per B.t.u. of input, than any other fuel. It is the most convenient fuel for use with automatic controls and only on gas fired equipment is it possible for the customer to receive a definite statement as to B.t.u. output that will be maintained.

With gas, the combustion being practically 100%, it is possible in the design of a gas-fired furnace to allocate much less space for the products of combustion to pass through than when other fuels are used. This in turn provides the possibility for the gas-fired furnace to have a very large heat exchanger with much more surface exposed to the circulating air than can be provided in a furnace of the same size, using other fuels. That results in the heat exchanger operating at a comparatively low temperature, which in turn gives the gas furnace a very long life. Any

well designed gas furnace should have life much longer than a similar furnace using other fuels. As an example, there are in operation today sheetmetal, gas-fired furnaces built before the year 1900. The large and comparatively cool heat exchanger also reduces the possibility for any dust carried in the circulated air being carbonized.

When it comes to cleanliness, it is not difficult to find many homes in which the annual bill for cleaning and redecorating, due to the use of inferior heating equipment, is several times the fuel bill. Not only does the well designed gas furnace tend to keep the inside of the house clean, but it never even soils the clothes on the neighbor's wash line. In fact, the gas furnace is a good neighbor and that is more than can be said for most heating systems using other fuels. It is well to note in this connection, that inasmuch as neither soot nor smoke are created in a gas-fired furnace, its heat exchanger will remain clean and thus be just as efficient after years of use as it was the day it was installed.

Virtues of Automatic Furnace

The automatic gas-fired winter air conditioning furnace is the most cleanly, convenient and comfort-giving heating appliance that can be installed in a home. It demands no particular part of the house for its location. It operates equally as well in the basement, attic or any place between, and is no more unsightly than many circulating heaters located in the best rooms of some otherwise fine home. After it is started it is 100% automatic, maintaining the temperature as set on the thermostat with the minimum amount of fuel for the heating desired, until it is shut down in the spring. Then, if the owner wishes, he can use the blower to circulate air through the house in the warmer months.

Warms and Filters Air

In addition to furnishing controlled temperature, this furnace filters the air before recirculating it, thus removing dust that otherwise would be deposited throughout the house. That not only means a cleaner home, but also a more healthful home in which to live. Disease germs are without wings or legs, so they usually depend upon dust particles for their transportation. When dust is removed from the air, many disease germs and their best means of transportation are eliminated. This furnace also automatically humidifies the air, relieving the irritation caused to the throat and nose by excessively dry air, as well as preventing wood work and furniture in the home from becoming dried out and cracked. When used with an adequate return air duct system, terminating in grilles located under windows and other points where cold air enters the home or is generated, the forced circulation provided by this furnace will remove that cold air, keeping the floors warm and free from cold drafts.

As fuel for a boiler or furnace, designed for its use, LP-Gas has all the advantages of natural gas, plus the advantage that it can be

Colquitt county court house, Moultrie, Ga., heated by an automatically controlled butane gas boiler.

stored at the point where it is to be used. The economy of this advantage is often lost when small storage tanks are used and frequent deliveries of fuel in small quantities are required.

The installation of a central heating system usually justifies a storage tank with ample capacity for the three coldest months. Properly scheduled, such storage would need filling about three times each year, even though it also served the entire kitchen load. The large storage tank would eliminate any question about the generation of all gas needed and should improve the relations between the dealer and his customer by doing away with frequent and irregular sized billings.

Having specialized in the manufacture of gas-fired boilers, furnaces and heaters for over 50 years, the Pennsylvania Furnace & Iron Co. recognized the great possibilities of LP-Gas as a fuel for such equipment. In 1936 it did considerable laboratory work with the various LP-Gases. Its first furnace installation was made at the University of Florida by Professor C. H. Janes of the University's College of Engineering, who also was interested in the development of LP-Gas business under the name of Green's Fuel. This particular furnace was installed in the agricultural extension department for experimental work, where it is providing controlled temperatures up to 180°.

The greatest difficulty found in the efficient use of LP-Gas in a furnace is the large amount of moisture contained in the products of combustion. This moisture must be quickly and completely removed from the furnace, with no possibility of it falling back onto the heat exchanger, or of its condensing and accumulating on some low spot in the furnace. In the "Pennsylvania" furnaces, these conditions were met by a newly designed, stream-lined heat exchanger having an exceptionally large heating surface and being entirely free

from any downward or horizontal travel for the flue gases. In addition these furnaces are heavily insulated and built for a minimum of heat loss through the cabinet walls.

Flexibility Is Exclusive to LP-Gas

Since this furnace has been available, many installations have been made throughout the southeastern states for use with the various LP-Gases. These furnaces have been located in heater rooms, basements, kitchens, hallways, closets and attics. This flexibility in location is an exclusive advantage held by gas-fired equipment and often saves the expense of a basement or special heater room, which would be required if other fuels were used.

As to the duct work used in connection with the furnace, it is most important that the return air ducts be of ample size and pick up the cold air along the outside walls where it enters the house or is generated, especially along the outside walls which receive the prevailing cold winds. It is the cold air that produces discomfort and the quicker it is removed to the furnace, the more satisfactory the heating results will be.

The vertical furnace can be set tight against the wall and its warm air plenum, the full size of the furnace, extended up through the ceiling into the attic; thus it can be made to appear as an offset in the wall. The return air plenum would be set through the floor under the furnace and the return air ducts run from it to the return air grilles. Likewise, if warm air ducts are used, these can be run in the attic from the warm air plenum to registers in the ceilings or walls.

As the LP-Gas dealer is interested in selling effective heating systems to build up a gas load, rather than fancy sheetmetal work, he will use round ducts in stock sizes wherever possible. Before the war a package containing a return air plenum, 150 ft. of 8 in. round duct, 12 adjustable 8 in. ells and 6 grilles with boxes, was available at $60. This material would provide the return air system for a 90,000 B.t.u. vertical furnace. Any mechanic, able to use a hammer, saw and screwdriver, with one helper, should be able to install that return air system and set the furnace within eight hours.

Air Ducts to Furnace Important

Assuming that the vertical furnace has been installed at the location of an old circulator, then with only the return air ducts installed to the furnace, the customer will have a much improved heating system, compared to his old gravity circulator. In place of cold air from the outside walls moving over the floors to the circulator for replacing the heated air, it will be taken to the furnace in the return air ducts and what little motion the air next to the floor has, will be toward the return air grilles. There will be positive circulation of warm air into every room equipped with the return air grille and an opening to the furnace location. That opening might be an open door, a wall grille or a warm air duct connection. The air circulated from the furnace will have been filtered and humidified as well as warmed.

The temperature will be maintained automatically by the thermostat, and the minimum amount of fuel will be used for the temperature desired. In the larger homes, or bungalows of odd shape and much exposure, well designed warm air duct systems are essential for the control of circulation and temperature in the rooms.

As to the comparative amounts of LP-Gas required for heating with a properly installed, forced air furnace and vented gravity circulators, floor furnaces, etc., it is well to keep in mind that equipment using forced air circulation, such as the furnace, must be better than 80% efficient to get the approval label of the A. G. A. Testing Laboratories, whereas the others rate at 70%. Then, too, the forced circulation makes much more effective use of the heat, so it is decidedly on the conservative side to estimate that from a given amount of fuel, the customer should get over 10% more available heat from the forced air central heating plant than he could possibly get from any type of vented gravity circulator or floor furnace.

Above is one of four truckloads of scrap, amounting to more than 4000 lbs., recently collected for Boy Scouts of the Quapaw Area Council by the Arkansas Butane Co., of Little Rock. T. T. Burgess, manager of the gas company, said the scrap was sold for approximately $50. The money was given to the Boy Scouts to buy war bonds. The two Arkansas Butane Co. employes and Scouts in the picture assisted in the collections. One of the boys is the son of Mr. Burgess.

Hospitals Like LP-Gas

SPECIALIZATION in the institutional field with large scale LP-Gas installations has led American Gas Systems, Inc., at 4030 Chouteau Ave., St. Louis, to develop a special department for hospital service which W. J. Colton, manager, has found one of the most valuable assets of the firm under present war conditions, for usually it is possible to get high priority numbers for material for such projects.

While selling hotels, inns, taverns and restaurants in suburban or country locations where city gas mains do not extend, Mr. Colton has been steadily calling upon hospitals, presenting the idea that LP-Gas is more economical for cooking, refrigeration and sterilization than electricity or oil. To back up his claims, the company has made several experiments in city hospitals, and has been able to successfully sell liquefied petroleum gas to a score of hospitals in the past two years where it had never been considered before.

Hospitals now using LP-Gas include the Highland Hospital in Highland, Ill, now using a 2500-gal. butane underground tank system for an eight-burner Majestic range, water heating, sterilization and all kitchen purposes; a large hospital in Washington, Mo., using it for all kitchen purposes, and a dozen scattered along the Mississippi river maintained by townships, insurance organizations and industrial plants.

"We comply with the underwriter's regulations and go quite a bit farther," Mr. Colton said. "Any hospital can be sold on the cleanliness, efficiency and economy of LP-Gas once it can be proven that it's use is not dangerous."

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The LP-Gas ranges in the kitchen of the Highland, Ill., hospital, one of many such institutions using butane for fuel.

▼

Small Equipment Opens Channel For Large Industrial Payload

By JOSEPH S. FAGAN
Manager, Mutual Liquid Gas Company, Inglewood, California

THERE are unlimited opportunities for LP-Gas dealers throughout the country to substantially increase their incomes by selling specialized equipment to local industrial and commercial firms. Too often when a dealer solicits the domestic accounts in his territory, he thinks he has put forth his maximum effort.

How about the plumbers and tin smiths and roofers and welders and metal workers and factories and foundries and auto wash racks in his town? And how about the big service corporations and the city government, itself? These are not war firms — they are permanent parts of every business community, and will continue to serve their clients long after the war is over. That right now most effort is in some way tied in with the war only serves to broaden the field and enlarge the volume of business.

Let us discuss a few kinds of equipment that operates better on liquefied petroleum gas than on any other fuel and that can be sold to numerous firms in almost every town or city—now or when peace comes.

As far back as 1934 the Mutual Liquid Gas Co. became cognizant of the needs of the plumbing and sheet metal trades for efficient lead melting furnaces and torches. Incidentally, we had need of some new LP-Gas business. We had been helping plumbers repair their old burners and pots and the idea occurred to us to develop some of our own. We did this, patenting different developments one after another until suitable furnaces and torches were accomplished. The clients we had been dealing with became our first purchasers and are

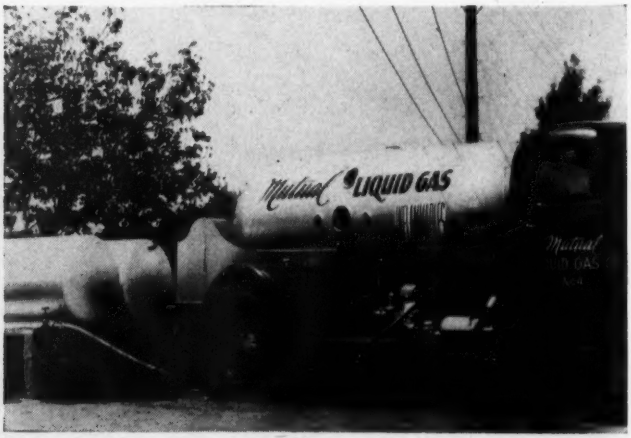
W. E. and J. S. Fagan, twin brother partners in the Mutual Liquid Gas Co., Inglewood, Calif.

still our loyal customers. Naturally, plumbers are called out on every manner of jobs and bring us word of new construction work undertaken by contractors and builders. These we promptly follow up to obtain new orders for equipment that would make their jobs easier and speed up construction.

The Associated Telephone Co., Ltd., operating in southern California, was the first large account to purchase our new furnaces and torches, which were used for cable splicing. This firm was using gasoline furnaces and carbide torches at the time. They had had some experience with LP-Gas sometime before but went back to gasoline. They were resold and are now using approximately 100 of our units. Gasoline furnaces have been entirely abandoned. This company, which has grown to three times its size since we first sold them, operates several thousand miles of overhead and underground lead cable in its territory.

Field and shop unit for plumbers when several men are using lead from the same melting kettle on construction jobs.

The Water and Power Department of the City of Los Angeles has standardized on Mutual furnaces. They are used for under-



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Mutual Liquid Gas Co. refills its cylinders from this tank truck, using a Smith butane-propane pump and a Pittsburgh Equitable meter.

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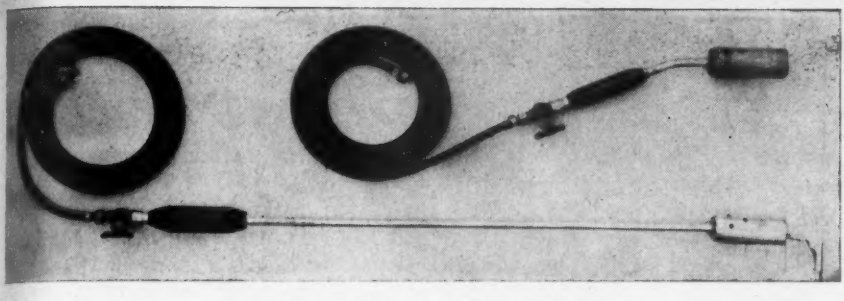
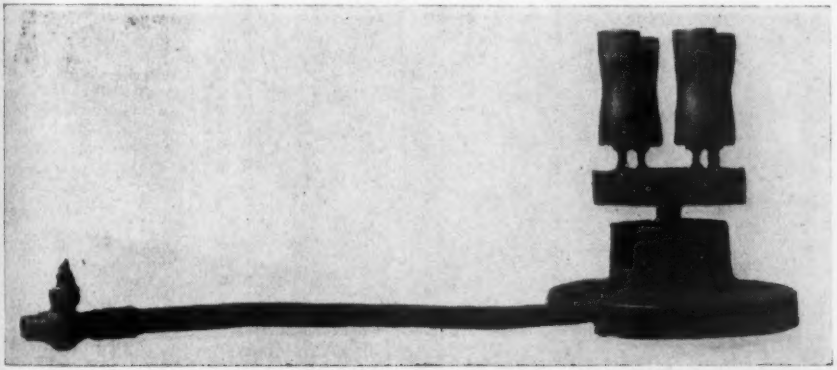


Propane industrial heating torches.

ground cable splicing, powerhouse construction, sub-station work, switchboard and line work, and many hours of labor have been saved since the gasoline furnaces were replaced by LP-Gas furnaces.

The Southern California Edison Co. is using our furnaces and torches over its entire system where construction and repair work are under way, also in the sub-stations and powerhouses. One particular torch is used for the melting of insulating compound from potheads. The insulation that is in these hold a high voltage terminal.

This insulation will develop cracks over a period of time and will allow moisture to creep in, causing a serious leak or short circuit. These torches are used at high levels and 50 to 60 ft. of 3/16-in. gas hose is attached to each torch. The torch is carried up to these elevations by the workmen and lighted when ready. This is a great advantage over the gasoline torch which has to be generated on the ground and then tied to a handline and sent up to the electrician. There it would have to be kept burning even when not in use or else it would have to



LP-Gas burner for use on portable water heaters, tar kettles and a wide variety of similar units. Also used in army camps where large boilers are set up temporarily.

be pumped up and regenerated. This could not be done when the wind was blowing so the usual practice was to tie it to the handline and lower it to a man on the ground to relight. Many hours of time and labor are now saved through use of the LP-Gas torch, to say nothing of the greater convenience and safety.

Many plumbing contractors have completed their work weeks ahead of the allotted time because of using LP-Gas and our equipment. Our field units were developed for fabricating soil pipe manifolds at the field shops. These carry minimum capacity lead pots of 260 lbs. A pot is placed in the shop where it is accessible to all the workmen making up these manifolds. Each workman will dip the lead he needs for a joint without disturbing any of the other workmen. When ready, these manifolds are hauled out to the place where the building is to be erected; there set up, and the house built around them. Many miles of sewer and water lines are laid with the leaded or compound joints melted with our gas and equipment. Often, special units have to be built, some mobile and some portable.

Practically every naval base, dry dock, naval hospital, air base and army barracks in southern California is using our mobile or portable furnaces and torches and LP-Gas where before they were struggling along with outmoded gasoline equipment. Army and navy engineers have very strict rules on the use of LP-Gas and equipment and

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A mobile unit for pipe line and sewer construction jobs for melting compounds, lead, etc. This unit carries two 8-gal. melting pots with valves.

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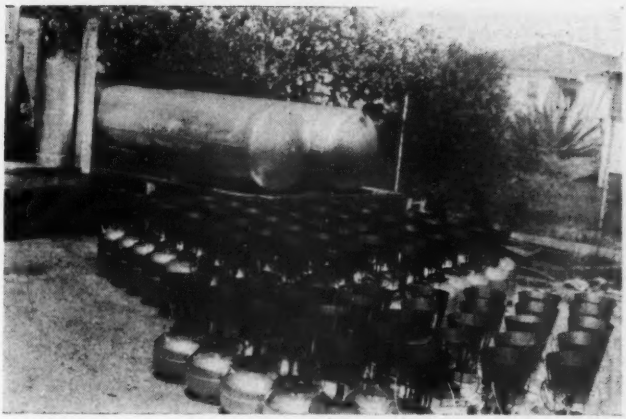

A group of small melting pots bought by the Bureau of Power and Light, Los Angeles. Similar ones are used by the Associated Telephone Co., of southern California.

approval must be obtained at the beginning of all new construction. As most engineers were at first unfamiliar with LP-Gas, they had to be sold on its safety and efficiency. We were able to do this and all of our equipment now carries a high priority rating. Our gas equipment is classified as "tools."

All dealers cannot manufacture equipment but they can get high priorities on equipment needed for war jobs which plumbers and others are performing now. And don't forget that the firms you now work with and sell are the same ones that after the war will be your permanent customers for equipment sales and the means of future load building.

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Gas Fire Losses Smallest Among Competitive Fuels

Gas and gas appliances ranked far below comparable products as a cause of fire losses, according to "Facts About Fire," a recent publication of the National Fire Protection Association. Here are some interesting figures estimated from State Fire Marshals' reports for 1940:

Cause	*No. of Fires*	*Loss*
Electrical	55,000	$26,000,000
Chimneys, flues (defective)	58,000	15,000,000
Smoking	87,000	14,000,000
Defective heaters	19,000	8,600,000
Hot ashes, coals	16,000	2,500,000
Oil burners	7,000	2,000,000
Gas and appliances	4,000	1,900,000

Many other causes of fires are listed, with the "Unknown" category accounting for 78,000 resulting in loss of $300,000,000.

◆ ◆

Butane Gas Plant Near Lusk, Wyo., To Be Enlarged

The contract has been awarded and priorities granted for the enlargement of a butane gas plant, owned by Continental Oil Co. near Lusk, Wyo.

The contract for construction and equipment was given to the Stearns Rogers Manufacturing Co., of Denver, Colo.

Work is expected to begin in early spring. The plant is located in the Lance Creek oil field.

Cost will be in excess of $500,000.

Increasing Isobutane Production For Natural Gasoline Plants

By G. N. HILE*
Technical Supervior, Natural Gasoline Department, Standard Oil Co. of California

IT is frequently said that the present international situation places American industry on the firing line. In the case of the Natural Gasoline Industry, the objective has been very clearly indicated: Recover maximum additional isobutane with a minimum use of additonal steel. To accomplish this, the principal points of attack open to the plant operator are the absorption system, the plant vapor cycle, and the rectification process. It is the purpose of this paper to review technical data available for the solution of this problem and to point out a few of the things that have already been done.

G. N. HILE

The absorption system is, of course, of prime importance in the extraction of isobutane. Through the use of the familiar Kremser formula[1], we are well equipped with the fundamental tools to handle this phase of the problem. The Kremser formula may be written in terms of readily available operating data as follows:

$$A = C_o \times \frac{O}{V} \times \frac{P}{ep}$$

where: A = Absorption factor

C_o = Absorption oil constant

$$(3.156 \times 1440 \times \frac{\text{Density}}{\text{Mol. Weight}})$$

O = Absorption oil circulation, Gals./Min.

V = Gas to absorber, MCF/day.

P = Absorber pressure, Lbs.abs.

e = Factor to convert vapor pressure to fugacity.[2]

p = Vapor pressure of the pure hydrocarbon at absorber base temperature.

In order to translate this formula directly into terms of actual per cent extraction, it is necessary to know the plate efficiency of the absorber and how to apply operating data. There is a considerable difference of opinion regarding exactly what data should be used in applying this formula. Unanswered questions are: Where should the temperature and pressure be taken, and should gas and oil measurements be made at the top or bottom of the absorber? These questions are the subject of current research study, and it is hoped we may expect an early answer. However, in the meantime, by arbitrarily selecting

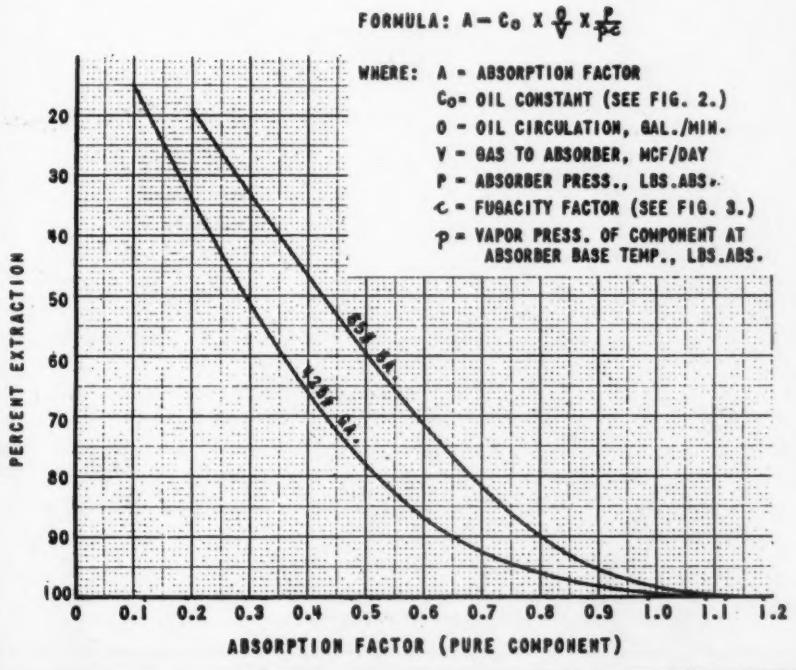
* A paper delivered before the September meeting of the California Natural Gasoline Association in Downey, Calif.

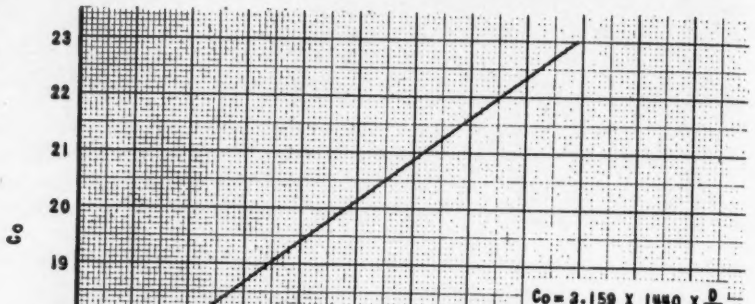
convenient points for taking the necessary data and correlating factors calculated from these data against the results of actual fractional analyses, it is possible to set up experimental curves which will permit full use of the formula with confidence. Figure 1 presents such a correlation. Curves are also presented (Fig. 2 and Fig. 3) which permit the ready determination of the oil constant (C_o) and the vapor pressure correction factor (c) which are required for the solution of the absorption factor formula.

By the application of this formula and correlation, the solution of absorption problems becomes one of straightforward mathematics. The use of these data is not, however,

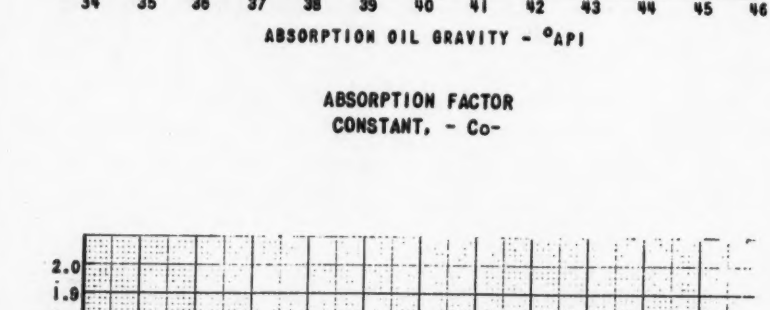
ABSORPTION FACTOR vs EXTRACTION FOR 16 PLATE ABSORBERS

FIG. 1.





ABSORPTION FACTOR
CONSTANT, - Co-



ISOBUTANE FACTORS TO CONVERT VAPOR
PRESSURE TO FUGACITY

recommended for vapor reabsorber calculations where unusual volume and temperature changes occur both in respect to absorption oil and gas.

In working out the economics of contemplated changes to improve absorption factors by refrigeration, increased oil circulation, changes in pressure, or changes in oil quality, particular care must be given to the operating position on the absorption factor curves. It will be noted that the advantages to be gained are approximately proportional to increases in absorption factor up to about 90% extraction. Beyond this point, the curves flatten out and increased absorption becomes more difficult.

After absorption, the method of handling plant vapors is of utmost importance. The method or combination of methods which will be most effective depends upon the operating pressure of the plant, available equipment and plant capacity. For this reason, every plant becomes an individual problem. Where there is ample oil circulating capacity, plant vapors may be satisfactorily treated in a separate absorber, a reabsorber, or by recycle to the plant intake. This system alone has limited application as vapor loads become abnormally high, at the high absorption factors required, the distillation system must operate at a relatively high pressure, and vapor cooling must be good. This method of operation is further limited to those cases where all isobutane can be retained in the plant product at relatively low pressures, around 25 lbs. Reid. Where Reid vapor pressures for total isobutane retention run from 30 lbs. to 40 lbs., the reabsorber system cannot be expected to be effective.

Vapors Handled by Compression

Where oil circulating capacities are limited and compressors are available, vapors may be more advantageously handled by compression, followed by cooling and recycle absorption. The pressure at which a vapor recompressor cycle is most effective again depends to a large extent upon available oil capacity, available compressor capacity, and cooling conditions.

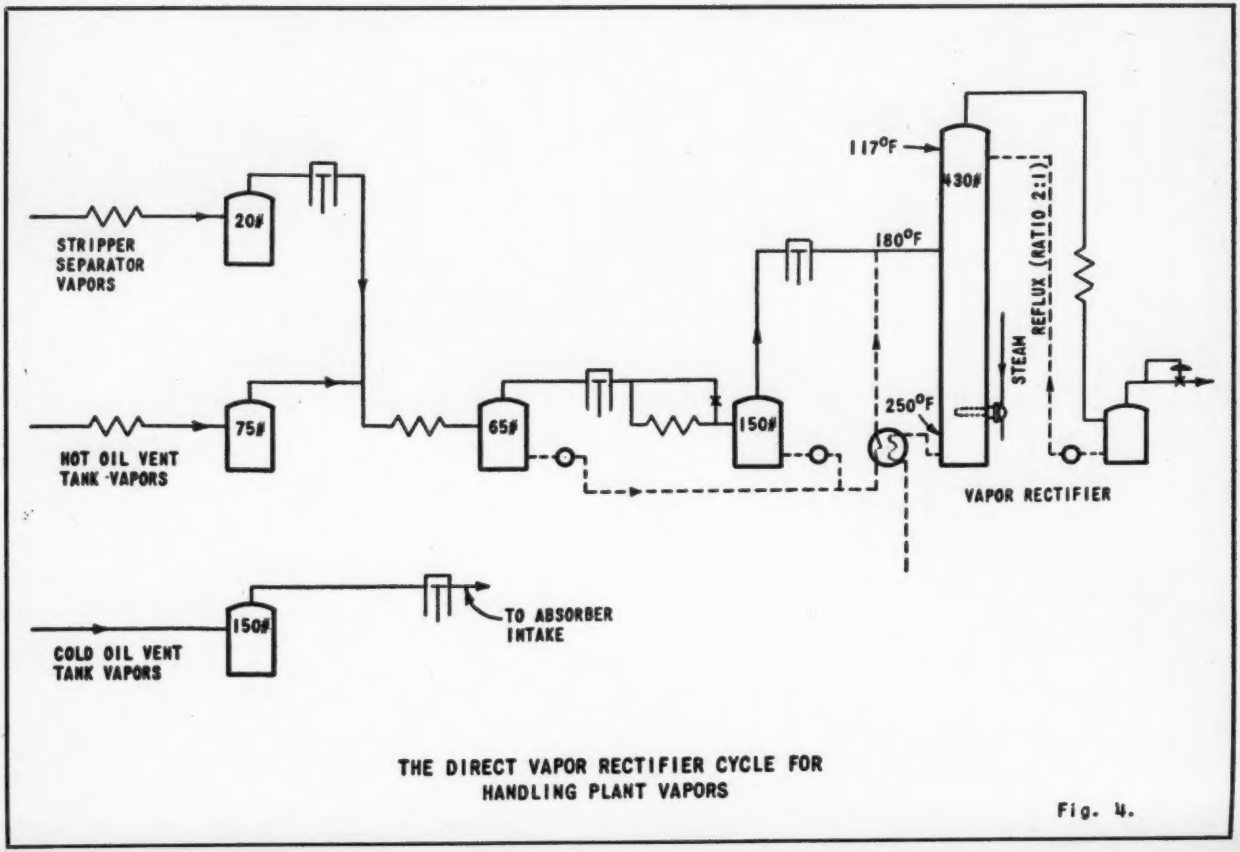
The capabilities of the vapor recompressor cycle to retain the isobutane absorbed is best illustrated by cycle calculations. Table I presents results of a series of such calculations wherein it is assumed that the oil capacity of a hypothetical plant is fixed at 350 gals. per minute. Other assumed conditions are:

Field Gas.....10,000 MCF/Day
Analysis of Field Gas:

		G/M
Methane	84.37%	
Ethane	7.58	
Propane	4.01	
Isobutane	0.77	0.52
N-butane	1.49	0.469
Isopentane (+)	1.78	0.71
Base Stock (Reid V.P.)	9.4 lbs.	

Absorber Pressure.....65 lbs./Sq. In.
Maximum Oil Circulation..350 GPM
Gravity of Absorption Oil.36.8° API
Stripper Coil Pressure....20 lbs. Ga.
Temperature of Stripper Coils.80°F.
Temperature of Vapor
Recompressor Coils.....80°F.

This plant, operating with a 65 lb. recompressor, will have a recycle to the absorber intake of 1855 gals. of isobutane and will retain 79.2% of the isobutane in the field



THE DIRECT VAPOR RECTIFIER CYCLE FOR HANDLING PLANT VAPORS

Fig. 4.

gas. With a 125 lb. recompressor, the isobutane recycled to the absorber drops to 747 gals. and the plant will recover 86.1% of the isobutane. With a 258 lbs. recompressor, the isobutane recycle is 260 gals. and the retention factor 89.0%. If it were possible to handle plant vapors without recycle, the isobutane retention factor would be 91.0%.

Table I also shows the recompressor indicated horsepower required for each pressure considered. For the assumed plant conditions, an increase in recompressor pressure from 65 lbs. gage to 125 lbs. gage resulted in an increase in isobutane production of 170 gals./day, at a cost of 17 indicated horsepower. The step from 125 lbs. gage to 250 lbs. gage increased production 75 gals. per day at a cost of 25 I.H.P. A very definite decrease in returns is therefore indicated for the higher pressures, with the ultimate limit being fixed very largely by available equipment. In fixing this ultimate limit, rectifier capacity must be given consideration as high recompressor pressures result in a material increase in the volume of propane and fixed gases in rectifier feeds. These comparisons, although calculated for a specific plant, will be found quite typical, as the character of plant vapors is surprisingly uniform from plant to plant.

The matter of recycle to absorbers and fixed gas contents of rectifier feeds becomes of major importance in high pressure plant operations. Under such conditions, a direct vapor rectifier is proving a very advantageous cycle. Figure No. 4 shows the flow sheet of such an installation in a Kettleman Hills plant. This cycle consists of directing the flow of all plant vapors, except cold oil vent tank vapors, through three stages of compression to a direct gas rectifier operating at such pressure that a propane-ethane reflux can be made in the presence of the fixed gases oc-

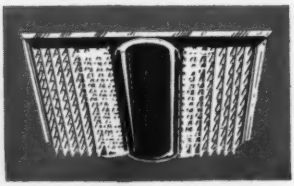
TABLE I.

Cycle	Vapors to Recompressor MCF/Day	Recompressor Indicated Hp.	Vapors to Absorber MCF/Day	Vapors to Absorber G/M Isobutane	Absorption Factor	% Isobutane Retained	Isobutane Recovered Gals./Day
65 lbs. Ga. Recompressor to Absorber Intake	814	51	534	3.47	0.776	79.2	1,980
125 lbs. Ga. Recompressor to Absorber Intake	696	68	338	2.21	0.791	86.1	2,150
250 lbs. Ga. Recompressor to Absorber Intake	677	93	215	1.21	0.800	89.0	2,225
*With no Recycle to Absorber	...	..	...	...	0.817	91.0	2,275

*Presuming all isobutane absorbed can be retained without recycle.

What is so rare as a steak, well done?

AND I mean rare! A good steak is a prize find these days and deserves to be treated kindly! To broil a steak to sizzling tenderness, to bring out all the natural juicy goodness, there's nothing like the Charcolator Broiler on our Grand Champion. It's just like broiling over a real live charcoal fire. Broiled meats are so tender and healthful that we use our Charcoal Broiler often for all sorts of delicious grilled dinners. That's just one of many reasons why our Grand is a real champion.



It's good for years and years of service. But when we're ready for another, I'll never be satisfied with anything but a Grand.

WHEN PEACE COMES...IT WILL BE GRAND

Grand

curring in plant vapors. Vapors are cooled after the first and second stages of compression, but vapors from the final stage are delivered directly to the rectifier without cooling. All recompressor condensates are also directed through the vapor rectifier. This unit, operating with an overhead reflux ratio of two to one, is capable of reducing the ethane content of the kettle product to less than 1% and the propane content to 15-20%. The residue gas contains from a trace to one-half of one per cent of isobutane.

Cooling Requirements Are Relieved

This cycle eliminates all vapor recycle to absorber intake except that from the cold oil vent tank; it eliminates the fixed gas load from the final rectifier, and materially relieves the cooling requirements of the plant. This latter feature is particularly attractive, as plants "hopped up" for maximum isobutane absorption often are faced with overloaded cooling systems which are difficult to expand. It is, of course, desirable that oil and gas flows to the absorber be cooled to as low a temperature as practical. However, with the vapor rectifier cycle, vapors from the stripper, hot oil vent tank, and recompressor need be cooled only enough to accommodate compressor operation. With the vapor rectifier operating at 430 lbs., a propane-ethane reflux can be made at temperatures around 100°F. The condensation of a propane reflux for final gasoline rectification is also greatly facilitated because of the complete elimination of methane and substantially complete removal of ethane from the rectifier feed.

To gain the maximum advantage of existing equipment, consideration must also be given to the method of venting rich oil. In plants operating at 150 lbs. and above, a very considerable advantage can be gained by venting the rich oil from the absorber before it enters the heat exchanger. This cold oil vent should be taken at as low a pressure as is practical. Vapors vented here will usually contain less than 0.5 G/M isobutane and the bulk of the fixed gas. This vapor can therefore be recycled to the absorber intake or treated separately with very little loss, and vapors occuring down stream from this point are much more condensable. The advantage of such a cold oil vent tank in plants operating at pressures below 150 lbs. is questionable, as gain that can be realized is offset by the necessity for using rich oil pumps.

Venting Method Is Important

The advisability of venting rich oil at points between the cold oil vent tank and the stripper is questionable. With a recompressor cycle there is no advantage to be gained from a condensation standpoint as poorer condensation in the stripper coils is offset by better condensation in the vapor recompressor system. There is, however, a horsepower and stripper capacity advantage to be gained by venting the rich oil before it enters the preheaters. Vapors vented here contain in the order of 2.0 G/M iso-

butane, and their recycle direct to the absorber is to be avoided where there is sufficient absorption oil circulating capacity to maintain high absorption factors.

Two Common Recovery Methods

The operation and instrumentation of rectifier systems for total isobutane recovery are subjects too broad to be covered extensively herein. However, a few generalizations will serve to outline the problem. Two methods are in common use: One, wherein all isobutane is retained in the natural gasoline which is then delivered to refineries for further fractionation, and the other, which effects separation of isobutane at the gasoline plant either as such or as a fraction of liquefied petroleum gas.

The retention of isobutane in the natural gasoline is contingent upon the ability to make a propane reflux for the gasoline rectifier. The control of such a system is most satisfactorily effected by placing the control element of the kettle vaporizer in the column five or six plates above the feed. This instrumentation results in variation of kettle and top temperatures in phase with the quality of the feed, and at the same time prevents the loss of isobutane in the residue vapor.

The production of isobutane as such or in a liquefied petroleum gas cut lends itself to a large variety of equipment arrangements and instrumentation. The arrangement most effective will be dictated by available equipment and specification requirements. Under certain conditions, rectifier side-cuts may be taken off which contain the bulk of the isobutane. When using a vapor rectifier, the isobutane may be isolated by cutting deep into the natural gasoline and condensing the entire rectifier residue for an isobutane cut. Where isobutane is produced as such, series rectification becomes necessary.

In conclusion, it is important to emphasize again that the most satisfactory method of producing the maximum production of isobutane with the minimum use of steel is an individual problem for each plant. With regard to absorption of isobutane, the absorption factor formula and correlation are available which permit a mathematical solution to this phase of the problem.

The handling of plant vapors presents no problem where adequate absorption oil capacity is available. With oil capacity limited, recompressor or vapor rectifier systems offers the most promising solution.

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1. Proceedings, California Natural Gasoline Association, Feb., 1930, "Theoretical Analysis the Key to Absorption Plant Design," by Alois Kremser.

2. Proceedings, California Natural Gasoline Association, May, 1938, "Equilibrium Relations for Paraffin Hydrocarbons at High Pressures and Ordinary Temperatures," by Robert B. Bowman.

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Revised Protection Manual Now Available From A.G.A.

The American Gas Association's book, "War Protection of the Gas Industry," the second issue of that publication, is available to members at $2.50; to others, $5.

This book tells how to prepare gas plants and other facilities against enemy attack.

Rego Equipped Tanks
Ready for Installation
at the Project.

REGO

REGO

LP GAS EQUIPMENT

BUY WAR BONDS
FOR VICTORY

SERVES WAR HOUSING PROJECT

Alert distributors of LP Gas and Rego Equipment are doing an outstanding job in the war effort. Their installations are in daily use for industrial and domestic heating and cooking in war plants, training camps, air fields, houses for war workers, etc.

An interesting application of Rego Equipment is the installation just completed at a southern war housing project by Automatic Gas Co. of Alabama. Space heating is supplied to 557 units by seventy six 250 gallon tanks and twenty three 1000 gallon tanks. Rego units are installed on each tank. The 250 gallon tanks are equipped with Rego No. 2500 Regulators, with low-pressure lines to each unit. The 1000 gallon tanks are equipped with high-pressure regulators and high-pressure lines to within 5 feet of the housing unit, where a Rego No. 2300 regulator is installed.

This is another example of the many vital ways in which LP Gas and Rego Equipment are helping to win this war.

Our factory-trained sales engineers can help you with your problems. Write us today.

Part of Southern War-Worker Housing Project Served by Rego.

Insure perfect performance and economy by insisting on genuine Bastian-Blessing products identified by the RegO trademark.

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THE BOTTLED GAS MANUAL

Chapter 17

Competitive Fuels —Wood—

In Two Parts—Part 1

"WHAT will gas-fired water heating cost?"

This is a natural question for the prospective customer to ask, not only in reference to water heating but to any other service which we may seek to render him by the use of propane, but before we can answer this question or proceed with our study of other propane gas applications we must learn something about other fuels, their characteristics, efficiencies under varying conditions of application, and the things which make them desirable or unsatisfactory.

A complete listing of all the fuels used by man would be an interesting one. It would include substances all the way from dried grasses and seaweed to chaff mixed with dung and pressed into pellets not unlike the so-called charcoal briquettes so extensively used by American tourists in camp stoves. Obviously many of these fuels belong to civilizations which for some time to come will not be in the market for propane service, so we must confine our considerations to those fuels which are most commonly used in America.

Our Common American Fuels. There are five general classifications of fuels extensively used in America, each with a number of subdivisions. I have listed them in the chronological order of their acceptance by the public, *not* in relation to their popular acceptance, for this matter of popularity varies in accordance with geographical lines and the abundance of the fuels at hand. They are as follows:

1. Wood.
2. Coal.
3. Oil.
4. Gas.
5. Electricity.

In the strictest sense, electricity cannot be considered a fuel, but a form of energy which is converted into heat so as to serve the purpose of a combustible fuel. In many parts of the country it is highly competitive, and we must therefore consider it on a comparative energy basis.

A Few General Remarks Concerning Wood as a Fuel. Few people realize that a considerable portion of our North American population uses wood as a fuel and because of this fact many manufac-

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• The Bottled Gas Manual series by C. C. Turner, started in the July, 1941, issue of BUTANE-PROPANE *News* and will continue to be published monthly in chapter form until completed. This series constitutes a valuable text book and field manual that should be invaluable to everyone in the liquefied petroleum gas industry.—*Editor.*

turers have "missed the boat" in failing to cater to this vast market. Others have contented themselves with making just a few changes in their coal burning appliances, not realizing that a good coal range is not necessarily a good wood burning range even though grates and linings are changed. There are vast sections of this country where, in spite of the use of wood as a common fuel, the supply of second and third growth timber suitable for fuel only is steadily increasing and threatens to overrun lands which have been laboriously cleared for other purposes. The construction of many of our earlier American homes is such that they are not adapted to modern heating plants and the wood burning range and railroad type of space heater still reign supreme. Furthermore, the installation of a central heating plant in the basements of such farm homes would spoil the cellar as the place for storage of vegetables which require cool air and would necessitate the construction at considerable cost of suitable vegetable bins and cellars. As an industry we shall gain nothing by attempting to cram down people's throats a fuel which from an economic standpoint does not fit their needs and our best results will be obtained if in such instances we sell propane appliances either from the angle of their auxiliary value or the advantages which they offer in convenience, speed and comfort. This is particularly true when a man has a woodlot and nothing to do but cut it when the long winter months curtail all other activities.

People living in rural areas do not live at the high rate of speed which curses our urban civilization, and they are apt to give more thought to fundamentals and economics than their city cousins. For these reasons we cannot hope to sell, serve or enthuse them with generalities. We must not only know the product which we are selling, but know the fuel against which we are competing, and we must know it from their angle and be able to talk it in their language. The order may be taken by the salesman, but often it falls upon the serviceman to keep the product sold, for which reason I shall go into considerable detail on each fuel, particularly in regard to wood, which, for some unknown reason is dismissed by the majority of sales organizations as a fuel of the horse-and-buggy days.

What Is Wood? To most of us it is just something that grows; it will burn, and we know that there are different kinds of it which are hard or soft and possibly adapted to different purposes. Combustion is a chemical process, and what very few of us realize is that *when considered from this angle all woods contain approximately the same elements and compounds in proportion to their weight.* There is one notable exception to this in the coniferous woods which contain percentages of hydrocarbons in the form of turpentine and other like distillates.

When "green", or freshly cut, the proportion of water by weight contained in wood varies. In some specimens it is as little as 30%, in others it may be as much as 50% and a fair average might be 40%.

It requires from eight to 12 months of atmospheric seasoning to reduce the water content of a wood to an average of 22½% by weight, and a fair proportioning of its other constituents at this stage of dryness is somewhat as follows:

Carbon	50%
Hydrogen	6%
Oxygen	41%
Nitrogen	1%
Ash	2%
Total	100%

What Is the Process of Combustion of Wood? In the proper combustion of any solid fuel there are really two distinct steps. Different elements have different ignition temperatures, or in other words, different levels of heat at which they unite with oxygen in combustion. The temperature at which the fixed carbon in wood unites with oxygen in combustion is in the vicinity of 600° F., while the ignition temperature of hydrogen is slightly above 1100°. This difference in temperature levels results in the gaseous constituents of the wood being driven off from it and later burning above what we commonly term the "bed" of the fire, and this is one of the reasons why appliances for the use of solid fuels must have large and properly designed combustion chambers in order to take advantage of the heat generated in the combustion of these gases. Water, in the form of steam or vapor, is driven off from the solid fuel at a temperature well below the ignition point of carbon, and as it contributes nothing to the net energy produced but rather deducts from it, in that it must be heated to the same temperature as the escaping flue gases, we must take it into consideration. A clear understanding of these simple fundamentals of combustion will help us in being able to follow the application of Dulong's formula in the next paragraph.

The Average Heat Content of One Pound of Wood. Where water is formed by combustion or forms a part of the combustible, a fuel has two heating values. The gross heating value (sometimes referred to as GHV) is the heating value of the fuel where it is possible to reclaim the heat which has gone into the water. The net heating value is that of the fuel when it is impossible for us to reclaim this heat. As the high stack temperatures of wood burning appliances prevent our reclaiming this heat we are interested in net heating values. Dulong's formula establishes the gross heating value of a fuel, after which it will be necessary for us to compute the heat lost in water vapor passing off through the flue.

In Dulong's formula:

$$V = \left[14{,}600C + 62{,}000\left(H - \frac{O}{8}\right)\right]$$

in which

V=The gross heating value of the fuel, in B.t.u.

C=Its percentage by weight of carbon content.

H=Its percentage by weight of hydrogen content.

O=Its percentage by weight of oxygen content.

If we substitute the average percentages given for the chemical content of wood we have—

$$V = \left[(14{,}600 \times 0.50) + 62{,}000 \left(0.06 - \frac{0.41}{8} \right) \right]$$

or 7842.5 B.t.u. gross heating value, but as 22½% of the original weight of the wood was made up of water we must decrease this amount by 22½% or

$0.225 \times 7842.5 = 1764.56$ B.t.u.

and this leaves

$7842.5 - 1764.56 = 6077.93$ B.t.u.

We must also deduct the amount of heat used to raise the temperature of the water content to that of the flue gases, and this requires three calculations:

1. *B.t.u. Required to Raise Water Temperature to 212° F.* If we assume 60° F. as the temperature of the water content before the start of combustion, the .225 lbs. of water will require $(212 - 60) \times 0.225 = 35.256$ B.t.u. in this step.

2. *B.t.u. Required to Vaporize Water at 212 ° F.* As 970.4 B.t.u. are required to vaporize 1 lb. of water at 212° F. we will require $0.225 \times 970.4 = 218.34$ B.t.u. for this step.

3. *B.t.u. Required to Raise Vapor to Flue Gas Temperature.* A flue gas temperature of 400° F. is not unlikely. The specific heat of superheated steam varies slightly, but for 400° F. at approximately atmospheric pressure it may be taken as .462, therefore for this step we shall require $(400 - 212) \times 0.225 \times 0.462 = 19.5426$ B.t.u.

In these three steps we have determined upon $35.25 + 218.34 + 19.54 = 273.13$ more B.t.u. which must be deducted from 6077.93, leaving the net heating value of 1 lb. of wood at approximately 5804 B.t.u. In our future calculations we will merely use the whole number, 5804.*

The Heat Content of a Cord of Wood. While we could arrive at fairly close approximations of the heat content of wood if it were sold by the pound this unfortunately is not the case. Here in America we merchandise wood by the cord and a cord is supposed to measure 4 x 4 x 8 ft., or to contain 128 cu. ft. This entire 128 cu. ft. is *not* solid wood, and the percentage of it that is solid varies with the diameter of the cordwood pieces. How this effects the amount of solid wood in a cord can be judged from official tests made in Prussia in the days before the first world war, and tabulated in Table I.

We are reasonably safe in taking the average figures as our basis for computations, for it is the American custom to cut sizeable trees into cordwood and work up the branches as well. On the basis of 5804 B.t.u. net heating value per pound of wood and 69.12 cu. ft. of solid wood to the cord, Table 2, showing the available heat contents of various American woods has been compiled.

Can Propane Successfully Compete with Wood? At first thought, with a net heat content of 18,658,529 B.t.u. for a cord of apple wood

* Claimed by A. R. Carr and C. W. Selheimer in their book "Fuels and Their Utilization."

it would seem to be impossible, but there are two factors which enter into the picture that we have not considered. These are:

1. The efficiency of the appliance in which wood is burned.
2. The efficiency with which we apply the energy put at our disposal by the appliance.

By way of example, one might have a 90% efficient water heater, but open the tap and let the hot water run down the sink drain. The efficiency of the appliance would still be 90%, but the efficiency of application would be zero. We should note one important fact; the efficiency of application is to be figured *after* the efficiency of the appliance has been determined, and the result of both efficiencies gives us what is known as the *over-all efficiency*. It is this matter of efficiencies which not only makes it possible for propane to compete with wood in some instances, but to show marked savings in others.

The Efficiency of Wood Burning Appliances. While wood was probably the first fuel used by man, he unfortunately has done the least to determine scientifically its efficiency in relationship to other fuels, and has jumped to the results obtained for a certain amount of money or effort involved. While we are interested in these things ultimately, they are not an indication of efficiencies. One might have two appliances, one burning wood and the other burning coal, but producing identical results. The coal appliance might accomplish its task on a ton of coal at $2.50 a ton and the wood burning appliance might do its job on a half a cord of wood at $8 per cord. The *cost*, in this instance would be less by using coal, but the *efficiency* would be greater by using wood.

Because of this lack of authentic information we must place much

TABLE 1. SOLID WOOD CONTAINED IN A CORD (128 CU. FT.)

Description of the Cordwood Sticks	*Percentage of Solid Wood in a Cord*	*Number of Cu. Ft. Solid Wood*
Split cordwood, 9 in. or over in original diameter	74%	94.72
Cordwood made up of pieces larger than 6 in. in diameter	69%	88.32
Cordwood made up of pieces between 3 in. and 6 in. in diameter	55%	70.40
Cordwood made up of pieces less than 3 in. in diameter	18%	23.04
Average	54%**	69.12**

* Kent, in his Mechanical Engineers Handbook, Eighth Edition, Page 804, arrives at 5860 B.t.u. with an analysis of C 51%, H 6.5%, O 42.0%, ash 9.5% and the water content amounting to 25%.

** The average is within 2% of that determined by Marcus Bull in Philadelphia in 1829. Bull gave as an average 56% or 71.68 cu. ft.

dependence in the establishment of wood burning appliance efficiencies on a comparison with other fuels, so for a moment we will desert wood and turn to coal. With stoker firing there have been exceptional instances where efficiencies as high as 80% have been obtained.* Some stoker manufacturers claim efficiencies of as high as 70% but this would appear to be high as their basis is for absorption of heat generated at the grate level. For handfired units one concern gives 50% efficiency for good and 60% for excellent results.

We know that stack temperatures of wood fires run almost without exception higher than those of coal fires, therefore inasmuch as this represents a direct loss it would be reasonable to assume that a coal fire on the average is more efficient than a wood fire. If, therefore, we allow wood fired appliances an efficiency equivalent to that for good hand firing of coal we are certainly being fair

TABLE 2. NET HEAT CONTENT, VARIOUS AMERICAN WOODS

(Compiled on basis of wood containing not over 22½% of moisture, net heating value per pound being 5804 B.t.u. and average cubical contents of a cord, less voids, being 69.12 cu. ft.)

Name of Wood	*Specific Gravity*	*Weight 1 Cu. Ft.*	*Weight 1 Cord in Lbs.*	*Net Heat Content Per Cu. Ft. (B.t.u.)*	*Net Heat Content Per Cord (B.t.u.)*
Alder	.68	42	2903	243,768	16,849,248
Apple	.745	46.51	3215	269,944	18,658,529
Ash, white	.638	39.28	2722	228,561	15,798,136
Beech	.655	40.89	2826	237,325	16,403,904
Birch, gray	.552	34.46	2382	200,006	13,824,415
white	.600	37.46	2589	217,418	15,027,932
yellow	.668	44.58	3081	258,742	17,884,247
Cedar, eastern red	.492	30.72	2123	178,299	12,324,027
northern white	.315	19.67	1360	114,165	7,891,084
southern white	.352	21.98	1519	127,572	8,817,776
western red	.344	21.48	1485	124,670	8,617,190
Cherry, black	.534	33.34	2304	193,505	13,375,066
wild red	.425	26.53	1834	153,980	10,639,098
Chestnut	.454	28.34	1959	164,475	11,368,512
Cypress	.482	30.09	2080	174,642	12,071,255
Douglas Fir, Coastal	.512	31.96	2209	185,496	12,821,483
mountain growth	.446	27.84	1924	160,703	11,107,791
Elm, American	.554	34.59	2391	220,760	15,258,931
Rock	.658	41.08	2839	238,428	16,480,143
Fir Balsam	.414	25.85	1787	150,033	10,370,281
Hemlock, eastern	.431	26.91	1860	156,186	10,795,576
western	.432	26.97	1864	156,534	10,819,630
Maple, red	.546	34.09	2357	197,858	13,815,970
silver	.506	31.59	2184	183,348	12,673,013
sugar	.676	42.20	2917	244,928	16,929,423
Oak, red	.657	41.02	2835	238,080	16,456,089
white	.710	44.33	3064	257,291	17,783,953
Pine, eastern white	.373	23.29	1610	135,175	9,343,296
long leaf	.638	39.83	2753	231,173	15,978,678
pitch	.542	33.84	2339	196,407	13,575,652
red	.507	31.65	2188	183,697	12,697,137
shortleaf	.584	36.45	2519	211,556	14,609,551
Redwood	.436	27.22	1881	157,985	10,919,923
Spruce, red	.413	25.78	1782	149,627	10,342,218
white	.431	26.91	1860	156,186	10,795,576
Sycamore	.539	33.65	2326	195,305	13,499,481
Tamarack	.558	34.84	2408	202,211	13,976,824
Walnut, black	.562	35.09	2425	203,662	14,077,117
Willow, black	.408	25.47	1760	147,828	10,217,871

to the wood burning appliance in setting its general efficiency at 50%. Note how our 18,658,529 B.t.u. for apple wood have now shrunk to 9,329,265 B.t.u. per cord!

(Part 2 of Chapter 17 of The Bottled Gas Manual will be published in the March issue of BUTANE-PROPANE *News. It will contain the Questions and Answers for the entire chapter.—Editor.)*

◆ ◆

Order Which Affects Services And Commodity Is Amended

The service regulation was amended Dec. 13 by the Office of Price Administration to make the maximum price charged for any commodity when sold in connection with a service the same as the maximum price fixed by a specific regulation for the same commodity when sold by itself. The order is designated as Amendment 12, MPR 165.

OPA said the amendment will tend to standardize prices consumers must pay for services on repair parts.

Formerly, under the services regulation, the seller was allowed to make the same charge for any service, which included a part, that he made during March, 1942, regardless of the maximum price set by any other regulation for any replacement part or other commodity sold in connection with the service.

Under today's amendment (No. 12 to Maximum Price Regulation No. 165, effective Dec. 18) the service seller must adjust his prices downward when the ceiling prices of the commodities he sells in connection with the service are specifically established at lower than the March, 1942, levels by other maximum prices regulations governing them. Conversely he may increase his charges in cases where the maximum prices of the commodities are fixed at higher than March levels by the other regulations governing them.

In either case, the service seller's charges for the actual service itself remain at the highest price he charged for the same service in March, 1942.

◆ ◆

Shell Executive Named Director of Refining, OPC

E. D. Cumming, vice president in charge of refining, Shell Oil Co., Inc., joined the Petroleum Administration for War on Dec. 7 to become director of refining, according to an announcement of Deputy Administrator Ralph K. Davies.

Mr. Cumming, a native of Alabama, was graduated from Alabama Polytechnic Institute at Auburn, and was first employed by the Shell Co. in its Pacific Coast refining operations. Prior to being transferred to New York he was for a time manager of Shell's big Wood River, Ill., refinery. In his new capacity he will work under the guidance of Assistant Deputy Administrator Bruce K. Brown.

◆ ◆

ODT Closes Detroit Offices

The Office of Defense Transportation has announced that its central mailing office at Detroit, Mich., has discontinued operations and that all matters pertaining to Certificates of War Necessity are now being handled by the regular ODT field force.

Henceforth, all applications for Certificates of War Necessity received at the Detroit office, as well as all correspondence pertaining to the ODT's mileage rationing program for commercial motor vehicles, will be referred to the appropriate ODT district offices.

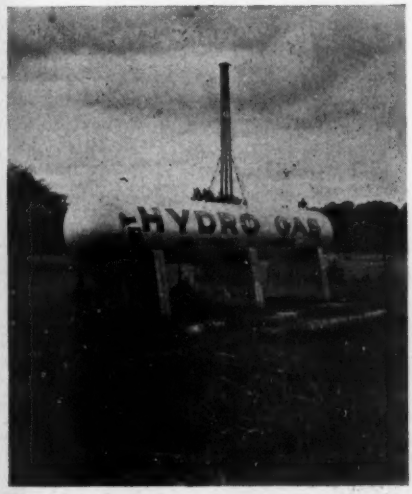
Sales Are Easy to the Gas-Conscious

SINCE July, 1941, the date that R. M. Wright, of Kerrville, Texas, bought out the interest of W. B. Brown in the Plumbing and Sheet Metal Works, the Hydro Gas company of that city, he has been endeavoring to make his services and system better known throughout Kerr, Bandera and Gillespie counties in the hill country section of Texas.

Many city dwellers have in recent years moved into the rural areas in these counties, bringing with them the desire to use gas. These have purchased systems fairly readily, he said. The way was just opening to sell systems to more of the native hill country ranchers when the war program practically curtailed activity.

One of his largest purchasers of systems since July, 1941, is E. B. Edmondson, who operates guest cottages above Hunt, Texas, on the South Fork of the Guadalupe river. Seven plants have been purchased for these.

R. M. Wright (right) and two helpers.



Bulk plants of Kerrville, Texas, Plumbing and Sheet Metal Works.

The bulk plant operated by the company has storage capacity of 3600 gals. A Ford truck with 1000 gal. tank capacity is used for distribution purposes. Roper ranges and Pittsburgh water heaters have been sold by the company. The firm services 150 butane systems.

Delivery of butane is made over five different routes. Mr. Wright finds that his customers are very willing now to let his deliveryman fill their systems to capacity when on the premises. This has been an outgrowth of the war program and tire-saving campaigns. The Butane Co., Brownwood, wholesales butane to the company.

Mr. Wright has been in business so long in Kerrville that he is now serving second generation customers.

LP-Gases Indorsed

By O. D. HALL

THE importance of liquefied petroleum gas in connection with the war program, was emphasized by the Interstate Oil Compact Commission in findings made public at the end of its winter quarterly meeting, held at the Biltmore Hotel, Oklahoma City, Okla., Dec. 18-19.

Twelve member states — Arkansas, Colorado, Illinois, Kansas, Kentucky, Louisiana, Michigan, New Mexico, New York, Oklahoma, Pennsylvania and Texas—were represented. The states of California, Indiana, Nebraska, and Wyoming were represented by official observers.

The findings of the Commission included: "The liquefied petroleum gas industry furnishes to over 2,000,000 American families, living beyond reach of natural gas transmission systems, a high quality, low cost gaseous fuel made from oil distillate and natural gas. Its use for synthetic products is growing daily. Chemical synthesis of natural gas is expanding to fill a multitude of the needs of complex modern life. The future will find automobiles drawn on tires made from gas and powered by a fuel obtained from chemical conversion of the same gas."

The report concluded with the recommendation that greater consideration should be given by the states to the conservation of oil, natural gas, and their by-products, including LP-Gas.

In connection with a report read by Samuel F. Peterson, state petroleum engineer of Illinois, relative to the stripper wells production in that state, the speaker pointed to the important part his state is playing in the manufacture of liquefied petroleum gas. "It is noteworthy that in addition to the butane from natural gas produced in Illinois," said Mr. Peterson, "a large quantity of butane is also available from the cracking of crude oil at refineries already equipped for this process. Illinois is therefore a natural location for the manufacture of butadiene for synthetic rubber."

The stripper oil wells of Illinois are favorably located with reference to transportation facilities and refineries, which is a decided advantage during war time, in having always available the oil for manufacture of LP-Gas and other purposes.

Oil Compact Commission in session at Oklahoma City. Left to right: Andrew F. Schoeppel, governor-elect of Kansas, chairman; Governor Leon C. Phillips, of Oklahoma, retiring chairman; Clarence T. Smith, of Illinois, second vice chairman. Standing: J. D. Reynolds, of Arkansas; Judge J. C. Hunter, of Texas, first vice chairman, and H. W. Bell, of Louisiana.

Truck Owners Needing More Gas May Enter Appeal

Streamlined procedures have been set up by the Office of Defense Transportation to handle appeals from commercial motor vehicle operators who consider the mileage and fuel allotments provided in their Certificates of War Necessity to be inadequate for their needs, the ODT announced Dec. 8.

A number of the original applications did not contain sufficient information for the ODT to determine with reasonable accuracy what the mileage requirements of the operators were.

In such cases, Certificates were issued bearing mileage and fuel allowances designed to tide the operators over until additional information could be obtained through appeals and new or supplemental Certificates issued.

Every effort will be made, ODT officials said, to grant commercial motor vehicle operators as much mileage and gasoline as they need to carry on necessary operations on an efficient wartime basis.

All appeals for adjustment of mileage and fuel allowances in the original Certificates, regardless of the reasons for the appeals, will be made on the same form—CWN-5-S for operators of more than two such vehicles.

Operators of commercial motor vehicles whose original Certificates have been lost or accidentally destroyed will apply for new Certificates on Form CWN-2.

◆ ◆

James S. Knowlson Resigns From War Production Board

Resignation of James S. Knowlson as vice chairman of the War Production Board was announced Jan. 4 by Chairman Donald M. Nelson. In making the announcement Mr. Nelson said that he was retaining Mr. Knowlson within the WPB organization on a "when actually employed" basis, so that he could be called on as a consultant or special assistant from time to time.

◆ ◆

August Gunthard Will Supervise Production At Dallas T. & W. Co.

August Gunthard, of Miland and Beaver, Pa., has been appointed general shop superintendent in charge of production of Dallas Tank & Welding Co., Inc., fabricators of the Economy Butane system, butane bulk storage tanks and transport tanks, according to W. W. Banks, president of the company.

A. GUNTHARD

Mr. Gunthard, a graduate engineer, comes to the Dallas company from the Treadwell Construction Co. of Miland, Pa., where he was superintendent and division manager. He was associated with that firm for 12 years, supervising the fabrication of all types of steel plate work, including the processing of equipment for chemical plants and oil refineries in accordance with ASME and API-ASME codes.

◆ ◆

Appliance Index Issued

The American Gas Association Testing Laboratories have issued a new directory of approved gas appliances and listed accessories, including war emergency models.

This list supplements the Oct. 1 issue of the directory and contains listings of all appliances approved during the month of Nov., 1942.

Propane Serves Ordnance Plant

PROPANE gas has been put to work in the promotion of national defense at the Oklahoma Ordnance Works, in northeastern Oklahoma.

The Northeastern Oklahoma Liquefied Gas Co., H. J. Porter, vice president and manager, Tulsa, Okla., has installed 10 propane supply systems at the plant, three in the powder, and seven in the TNT manufacturing laboratories. Each system has a capacity of 215 gals. (water measurement).

The propane gas was selected because of a dependable supply, always available in that area. It is being utilized principally for heating and cooking in the laboratories.

The Northeastern Oklahoma Liquefied Gas Co. is furnishing about 2000 gals. of propane a month to the ordnance works. Installations started in April of last year and were completed in November. The company serves 17 counties in northeastern Oklahoma and has headquarters in Tulsa. It has a modern bottling plant, also 6000-gal. tank storage capacity 12 miles east of Tulsa. A 2000-gal. tank is used for propane storage and a 4000-gal. tank for butane.

◆ ◆

Regional WPB Officers Given More Authority

A further step toward decentralization of the War Production Board was taken Jan. 8 with the granting of increased authority for approval of individual emergency preference ratings to the field offices of WPB.

The 12 regional directors of WPB are now authorized to approve, countersign, and issue individual preference ratings for emergency repair, up to and including AA-1, in accordance with specific instructions to be issued from time to time by the Deputy Director General for Distribution. Regional directors may authorize the deputy directors to perform these functions.

In addition, the 110 district offices may for the first time grant ratings for emergency repair, up to and including AA-2X.

The authority delegated is limited to cases where the material for which the applicant seeks priority assistance does not exceed $500 in value.

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Consumer Prices Not Affected By Dry Gas Base Date Change

Taking into account the cost of increasing dry gas production through expanded drilling programs and operation facilities, the Office of Price Administration on Dec. 29 changed the base date upon which maximum gas prices are determined from Oct., 1941, to May 1, 1942.

Establishing maximum prices at the May 1 level will permit, in some instances, increase of prices paid for the gas in the field but will not affect consumer prices, OPA stated. The adjustment in the base price date was necessary to relieve producers who between Oct., 1941 and May, 1942 entered into contracts involving drilling and expanded operations. The change of date will substantially eliminate production obstacles.

The change is contained in Amendment 51 to Revised Price Schedule 88—Petroleum and Petroleum Products—and is effective January 2.

◆ ◆

Rail Carload Requirements Changed for Gas Cylinders

General Order ODT No. 18—Revised—5, issued Dec. 31, provides that on and after Jan. 4 carload shipments by rail of empty gas cylinders shall weigh not less than 36,000 lbs.

Specifications for Gas Floor Furnaces Approved

Standard minimum specifications for gas floor furnaces of the gravity circulating type have been approved by the American Standards Association (Commercial Standard CS99-42.)

With the latest American Standard Approval Requirements for Central Heating Gas Appliances (ASA.: Z21.13-1940) as basic prerequisites, this standard covers construction and installation requirements for gravity circulating type gas floor furnaces, including those having single or dual wall register outlets, for use with natural, manufactured, mixed and liquefied petroleum gases.

This new standard, which was developed by the National Bureau of Standards includes the sizing, placement, general installation requirements, venting, gas connections and methods of certifying compliance with the standard.

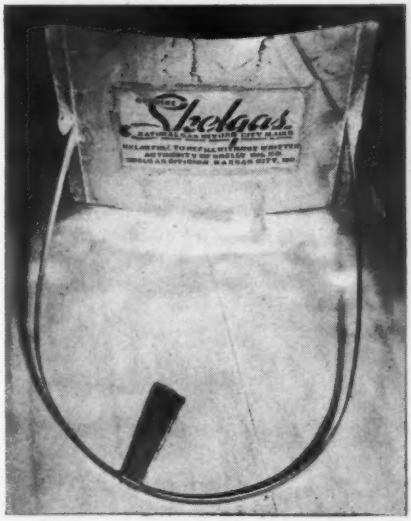
◆ ◆

Skelgas Uses Special Stencil For Cylinders In Defense Service

All Skelgas cylinders for both defense and consumer trade will be stamped hereafter by a special method employing thin brass stencils in accordance with a new system started in October by the Skelly Oil Co., Kansas City.

The defense cylinders, for which priorities have been obtained, will be stamped with the words, "Genuine Skelgas for U. S. Defense Service," while consumer cylinders will bear the identifications of Skelgas plus a warning not to refill without written permission of the Skelly Oil Co. It is the policy of the company not to sell cylinders or accept deposits on them.

By the new method the thin brass stencil rides the cylinders close and conforms itself to the body of the bottle. When the stencil is in place a paint spray is turned on, applying the paint through the stencil. The paint job is not expected to last through more than one service period



One of the new, thin, brass stencils used by Skelly Oil Co. to mark its LP-Gas cylinders.

and thus the words must be restamped for subsequent trips. Each bulk plant is equipped with a stencil and paint outfit and can stamp as many as 250 cylinders per day.

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Eric L. Kohler Named Executive Officer, PAW

The appointment of Eric L. Kohler as Executive Officer of the Petroleum Administration for War was announced Dec. 23 by Deputy Administrator Ralph K. Davies.

As Executive Officer, Mr. Kohler will serve as executive assistant to the Deputy Administrator in the handling of organizational and administrative problems within PAW.

New Standards Govern Gas Equipment Installations

Two American Standards, one governing requirements for installation of gas-burning equipment in power boilers (ASA No. Z21.33,1942), and the other governing listing requirements for gas valves (ASA No. Z21.15-1942), have been approved by the American Standards Association. The first of these standards, which were developed under the leadership of the American Gas Association, covers such requirements as installation of burners and controls; gas piping and meters; inspections and tests; as well as boiler room ventilation, accessibility for cleaning and inspection, and flues and flue connections.

The approved standard listing requirements for gas valves include such construction requirements as dimensions; compensation for wear; valve stems and handles; stops; latching type valves; strength; materials; assembly and marking; and such performance requirements as leakage; capacity; gas range burner valves with adjustable orifices, and continued operation.

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G. R. Fisher Is the First Philgas Manager to Retire

After eighteen years of service, G. R. "Bud" Fisher, manager of the Philgas Waterloo (Iowa) bulk plant, retired on June 1, the first Philgas manager to reach retirement age under the Phillips retirement income plan. He was transferred from former locations to Waterloo in 1938.

Mr. Fisher was honored with a party given by Philgas employes at the Russell-Lamson hotel, Waterloo, Iowa.

RESEARCH

• **EACH MONTH a competent staff reviews more than 70 publications serving the oil, gas and affiliated industries in a search for those published articles of value to technicians and executives in the liquefied petroleum gas industry. In this department of BUTANE-PROPANE *News*, brief abstracts of such articles are presented.—Editor.**

Pressure-Temperature Relations of Petroleum Fractions—W. L. Nelson and W. Haltenberger, Jr. *Oil and Gas Journal*, June 11, 1942, pp. 38-40. Part 1. Distillation curves on mixed-base petroleum oils at several subatmospheric pressures have been correlated against one another and against those of pure, normal paraffin hydrocarbons. The effect of vacuum is to displace the distillation curve vertically by a constant number of degrees at all points. The distillation data can be represented by converging lines on a Cox chart with the points of convergency lying along a line of constant pressure. Lines of constant percentage-distilled deviate slightly from the behavior of the paraffin hydrocarbons, and the extent of the deviation is greatest at relatively low and at high percentage taken overhead. Change of pressure alters the boiling points of petroleum fractions to a lesser extent than it alters the boiling points of the paraffin hydrocarbons.

Pressure-Temperature Relations of Petroleum Fractions—W. L. Nelson and W. Haltenberger. *Oil and Gas Journal*, June 18, 1942, pp. 40-42. Part 2. In Part 1, experimental data on the effect of pressure on the boiling range of petroleum fractions was presented along with a discussion of the methods that have been used by other experimentors in correlating vapor pressure with temperature. The discussion is continued in this article and terminates with a direct comparison with the vapor-pressure behavior of the normal paraffin hydrocarbons.

Theoretical Considerations of Power Loss Caused by Combustion Knock—C. W. Good. *Transactions*, A.S.M.E., May, 1942, pp. 317-321. In this paper the author presents a theoretical analysis to show that the power loss accompanying combustion knock may be attributed to a mass vibration of the gases within the combustion chamber rather than to radiation. Equations are developed, based on perfect gases to show that, on the basis of assumptions made, pressure rise with normal combustion is proportional to the quantity of the charge burned and to show the loss in effective pressure caused by the vibration resulting from knocking combustion. The latter have been developed for both the Otto and Diesel cycles and the relative theoretical losses for the two cycles is indicated. The author indicates the effect of differences between actual and assumed conditions.

Apparatus for Determining Distillation Ranges at Reduced Pressures—C. E. Watts, J. A. Riddick and Fred Shea. *Industrial and Engineering Chemistry*, Anal. Ed., June 15, 1942, pp. 506, 507. Low- and medium-boiling liquids and solvents are frequently evaluated by subjecting them to the A.S.T.M. method for distillation range. Both the apparatus and the procedure are recognized as stand-

ard by the important producers of solvents, and are incorporated as requisites in many commercial specifications. The advent of a number of new solvents whose distillation ranges cannot be easily or readily obtained at atmospheric pressures has necessitated the development of apparatus for determining distillation ranges at predetermined and uniformly maintained reduced pressures. Such an apparatus has been developed in the laboratory of the Commercial Solvents Corporation and has given very satisfactory results over a period of several years for control work in the manufacture of high-boiling liquids. Apparatus and procedure are described and illustrated.

Effect of Friction in Air Inlet and Exhaust Systems of Internal-Combustion Engines— Orville Adams. *Petroleum Engineer*, June, 1942, pp. 33, 34. Part 1. Simple energy and flow relationships of gases discussed.

Studies in Gaseous Hydrogenation and Polymerization Reactions—H. D. Burnham and R. N. Pease. *Journal of American Chemical Society*, June, 1942, pp. 1404-1410. It has been found that the polymerization reactions of ethylene and of acetylene and the hydrogenation reaction of ethylene are inhibited by small initial additions of nitric oxide. The results have been interpreted as indicating a chain mechanism for the above reactions, and that the nitric oxide reacts by combining with the free radicals or atoms and effectively prevents their further participation in the chain reaction. The polymerization and hydrogenation reactions of propylene were found not to be inhibited by small additions of nitric oxide. On the contrary, a slight acceleration of these reactions is caused by the addition of nitric oxide. Although no explanation for this is offered, it is pointed out that this is only one of the instances in which the reactions of ethylene differ in wide respects from the corresponding reactions of its next higher homolog, propylene. The catalytic effect of nitric oxide neither favors nor denies the possibility of a chain mechanism in the propylene reactions studied.

Phillips Petroleum 25 Years of Progress. *World Petroleum*, June, 1942, pp. 25, etc. Unending search for improved methods and new uses for petroleum has carried a 25-year old company to a place of leadership in applied research and to an important position in the nation's war effort.

Experimental Determinations of the Compressibility Factors of Several Natural Gases and the Application of These Data to Simple Gas Computations—A. B. Stevens and H. Vance. *Oil Weekly*, June 8, 1942, pp. 21-26.

Natural Gasoline Supply Men's Association Technical Manual (Fourth Edition) for the natural gasoline and refining industries. Address: Kennedy Bldg., Tulsa, Okla.

Code for Pressure Piping—L. Skog. *Heating, Piping and Air Conditioning*, May, 1942, pp. 302-304. Section 6, Fabrication Details, is discussed in this article.

Coatings for the Protection of Metals Underground — K. H. Logan, Research Paper 1446—Soil-Corrosion Studies, 1939, U. S. Bureau of Standards, Washington, D. C.

Petroleum Refiners and Rubber Situation. *California Oil World*, 2nd May issue, 1942, pp. 9-11. An analysis of the situation, with brief descriptions of the better known synthetics.

Butadiene Plant For West Coast

THE Southern California Gas Co., Los Angeles, is preparing to manufacture butadiene for synthetic rubber at one of its old manufactured gas plants, which has been inactive except for occasional standby service since natural gas was introduced to southern California about 15 years ago.

Under this program, the gas company is having an extraction plant built for the purpose of taking high pressure gas from the outlet of the company's compressor plant and extracting crude butadiene from the gas. The gas company, itself, is building additions to its existing boiler plant and gas generating facilities under an agreement with the Defense Plant Corp.

Since a large amount of existing gas plant equipment required in the butadiene process—such as gas generators, boilers, compressors, and gas holders—is available at the Southern California Gas Co.'s works, a considerable saving in expenditures for critical materials has been effected.

An operating agreement has been made by the Rubber Reserve Co. and the gas company. Napha feed stock will be used for producing gas containing butadiene.

The estimated production of butadiene by the gas company is 30,000 tons a year. Crude butadiene will be piped from the gas plant to Shell Chemical Co. near Torrance for purification, and then delivered to a copolymer plant, where it will be polymerized with styrene to produce synthetic rubber.

Initial steps looking toward the development of this project were taken in April, 1942, when technical engineers representing Rubber Reserve Co. made a nation-wide survey of existing plants potentially suitable for the production of butadiene. Several of the most adaptable plants for early production under tested methods were found in the manufactured gas industry. A study was made of the larger oil-gas manufacturing plants on the Pacific Coast, with the result that Rubber Reserve instructed Southern California Gas Co. to proceed with necessary plant additions and modifications for the early production of butadiene.

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E. L. Mills Will Serve On Industry Integration Com.

Ellsworth L. Mills, vice president of The Bastian-Blessing Co., Chicago, has been named assistant chairman of the Industry Integration Committee for the M-54 and M-55 fuze, it was announced Jan. 2 by the office of the Chief of Ordnance.

Integration committees of this type are now being set up throughout industry, their purpose being to furnish "clearing houses" for handling important problems concerning ordnance production.

As assistant chairman of the committee, Mr. Mills will work closely with an ordnance officer chairman as well as other prominent manufacturers from various sections of the country.

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High Octane Plant Will Be Constructed In Utah

High octane gasoline will soon be produced in a plant scheduled to be built by the Reconstruction Finance Corp.

The proposed investment is placed at $12,000,000 and the plant will be operated by the Utah Oil Refining Co. in North Salt Lake City.

John R. Kimberly Is Assistant Dir. Gen. for Operations

The appointment of John R. Kimberly as Assistant Director General for Operations was announced Jan. 12 by Ernest Kanzler, Director General. Mr. Kimberly was formerly Deputy Director General for Industry Divisions.

Curtis Calder, who has been assistant to Mr. Kimberly, will become Deputy Director General for Industry Divisions, and his assistant will be Dr. Ernest W. Reid, who has been Chief of the Commodities Bureau.

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Inventory Limitation Order Tells Merchants What to Do

Inventory Limitation Order No. L-219 provides that merchants whose inventories were less than $50,000 at the end of any quarter of their Federal income tax year are exempted from all of the provisions of the order.

It also exempts merchants whose net sales during the 12 months preceding the last day of that quarter were lsss than $200,000, as well as those whose sales are more than 50% in goods listed in "List A" of controlled materials. "List A" includes "coal, fuel oil, gasoline, and miscellaneous heat or power fuel." This includes liquefied petroleum gas.

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Idle Trucks Must Be Reported to the ODT

The Office of Defense Transportation reminds owners of commercial motor vehicles that all "idle" trucks, buses, and other vehicles—except taxicabs, rental cars, ambulances and hearses—must be reported to the ODT.

Reports should be made on ODT form CWN-3, a simple, single sheet form of only eight questions which can be obtained from and should be returned to the vehicle owner's local ODT District office.

Owners are required to list all commercial motor vehicles which were idle during the last 14 days of the month. The report should be filed within five days after the last day of the month covered by the form.

Commercial vehicle owners with no idle equipment are not required to submit a report.

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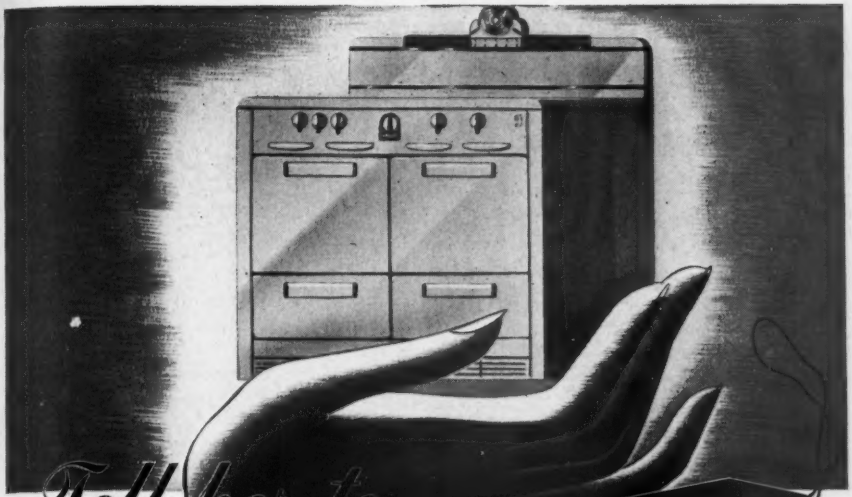
A. R. Bailey Commissioned As Major in U. S. Army

A. R. Bailey, Coast Counties Gas & Electric Co., San Francisco, has been appointed a major in the U. S. Army, with headquarters at Fort Mason where he is functioning as personnel officer.

Mr. Bailey has been identified with the LP-Gas industry through his company's butane plants in several California cities.



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Distribution of the Roper "Care and Operation" booklet will build up good will among your customers and future prospects. Write for Free sample copy today.

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BUY WAR BONDS

Roper Gas Ranges For All Type Gases Including (LP) Liquefied Petroleum Gas

Truck Tire Inspection Date Extended to Feb. 28

Joseph B. Eastman, Director of the Office of Defense Transportation, on Jan. 12 postponed the final date for initial commercial motor vehicle tire inspections, as required by General Order ODT No. 21, from Jan. 15 to Feb. 28.

After the initial inspection is made, the vehicle must then be presented for regular inspections every 60 days or every 5000 miles, whichever occurs first. All inspections must be made by inspectors designated for this service by the Office of Price Administration.

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Plumbing and Heating Repairs Further Restricted

The use of ratings obtained under PRO P-84, covering plumbing and heating emergency repairs, was restricted by an amendment Dec. 16.

No installer or supplier may apply his rating to obtain copper or copper base alloys which have been fabricated into sheets, wire, rods or tubes, or to obtain any scarce material the use of which could be eliminated without serious loss of efficiency by substitution of less scarce material or by change of design. Materials which are subject to ration order of the OPA cannot be obtained.

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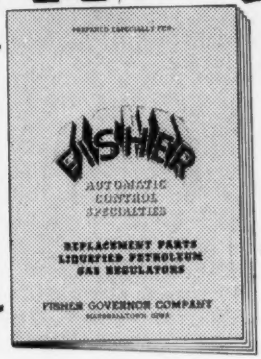
WPB Offices To Be Open Saturday Afternoons Also

The War Production Board has gone on a full 6-day week for the duration.

The regular office hours of WPB, both in Washington and in the field, now are from 8:30 a. m. to 5:15 p. m. daily except Sunday.

Purpose of the order is to insure that all offices and units of WPB function six days a week, without a let-down on Saturday afternoons.

FREE A COMPLETE SERVICE MANUAL FOR ALL FISHER L.P.G. REGULATORS



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Fisher Governor Company can still supply you with standard types of L.P.G. regulators, regulator assemblies and accessories, when your orders for this equipment carry proper certification, manually signed, in accordance with General Limitations Order No. L-86. Our stock of L.P.G. regulators and accessories were manufactured and assembled before the issuance of Order L-86 and we believe, will take care of your limited requirements for the "duration."

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Controlled Materials Plan Class B List Distributed

Early in January, the WPB began a nation-wide distribution of the official "Controlled Materials Plan Class B Product List." Copies may be obtained from the War Production Board, Washington, D. C.

Class B products of special interest to the LP-Gas industry include liquid level and mechanical gages, gas cylinders, fire extinguishers, fuel hose, valves, compressors, refrigeration and air conditioning equipment, cooking ranges, space heaters, floor heaters, wall heaters and unit heaters.

Under CMP, manufacturers of A products will receive their allotments of materials from the Claimant Agency or Agencies under whose programs they are operating. B producers, on the other hand, will receive their allotments from the appropriate Industry Divisions of the War Production Board.

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Fluor Corp. Opens Office In New York City

In a move that provides direct company representation on the Atlantic Seaboard, The Fluor Corp., Ltd., Los Angeles, announces the opening of a direct company branch office in New York City at 1919 R.C.A. Bldg., 30 Rockefeller Plaza, with J. I. Lawrence, formerly of the company's Kansas City office, in charge.

The new office is staffed and equipped to handle all matters pertaining to the sale of Fluor atmospheric aerator and mechanical draft cooling towers, gas cleaners and mufflers and direct company-customer contact on matters pertaining to the design, engineering and construction of synthetic rubber, toluene, aviation gasoline, alkylation, isomerization, recycling, natural gasoline and gas transmission plants and refineries.

What did *you* do today ... for Freedom?

Today, at the front, he died ... Today, what did *you* do?
Next time you see a list of dead and wounded, ask yourself:
"What have *I* done today for freedom?
What can I do tomorrow that will *save* the lives of
men like this and help them win the war?"

To help you to do your share, the Government has organized the Citizens Service Corps as a part of local Defense Councils, with some war task or responsibility for every man, woman and child. Probably such a Corps is already at work in your community. If not, help to start one. A free booklet available through this magazine will tell you what to do and how to do it. Go into action today, and get the satisfaction of doing a needed war job well!

EVERY CIVILIAN A FIGHTER

CONTRIBUTED BY THE MAGAZINE PUBLISHERS OF AMERICA

Five Rubber Companies Pool Resources for Synthetic Program

Jesse H. Jones, Secretary of Commerce, has announced that Rubber Reserve has made a contract with National Synthetic Rubber Corporation for the operation of a new government-owned synthetic rubber plant to be built in Kentucky by the Defense Plant Corp., a subsidiary of Reconstruction Finance Corp. The plant's output will be made generally available and allocated by the Government, together with the products of other government-owned synthetic rubber plants.

Formed for the specific purpose of operating the new government-owned plant, the National Synthetic Rubber Corp. is jointly owned by five long-established rubber companies, they being Goodall Rubber, Inc., and Hamilton Rubber Manufacturing Co., both of Trenton, N. J.; Hewitt Rubber Corp. of Buffalo, N. Y., Lee Rubber & Tire Corp., of Conshohocken, Pa., and Minnesota Mining & Manufacturing Co., of St. Paul, Minn.

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Mechanical Refrigerators Affected by Order

A supplementary order was issued Dec. 5 affecting the sale and transfer of domestic gas and electric refrigerators.

Such refrigerators may now be sold: (1) upon issuance of a certificate of transfer on Form PD-428 which is secured by written application on Form PD-427; (2) upon proper authorization to the army, navy, U. S. Maritime Commission, War Shipping Administration, Panama Canal; to an ultimate domestic consumer who shall certify that the refrigerator is for his personal use and that he has no other means of domestic mechanical or ice refrigeration at his disposal.

Earl Lyon Buys Gas Service From Otto H. Barrett

Earl Lyon of Ben Lomond, Calif., has bought the butane gas business of Otto H. Barrett in Boulder Creek, Calif., together with gas storage tanks and all other equipment. Mr. Barrett, who has another similar business in Salinas, found that conducting two businesses so widely separated was impossible during war time.

Mr. Lyon will continue to serve all the old customers, but under war restrictions deliveries will have to be routed on regular days and customers have been asked to watch their tanks and order gas ahead of time.

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Radio Show Tells Heating Industry's War Effort

The vital role of automatic heating equipment manufacturers, dealers and service men in the war effort was brought home to the radio public recently when the Minneapolis-Honeywell Regulator Co., Minneapolis, dedicated its "Alias John Freedom" programs on the Blue Network to the gas industry.

All commercial announcements on the program, which goes out over a network of 125 stations, are devoted to telling the gas industry's part in war production and in "keeping the home fires burning."

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"M" Pennant Awarded Globe-American Corp.

The "M" Pennant, Victory Fleet Flag and Labor Merit Insignia, highest honors of the U. S. Maritime Commission, were presented to Globe American Corp. at Kokomo, Ind., at a ceremony in the plant.

The Globe American Corp. was one of 16 out of 650 prime contractors of the U. S. Maritime Commission who were given this award for outstanding achievement.

The company has been shipping 12 complete lifeboats, with full equipment, daily but now it is increasing its daily output to 16 fully equipped lifeboats—which represents a sufficient number of lifeboats to launch four liberty vessels daily.

The bottled gas plant of the Fargo (N. D.) Bottle Gas Co., in operation since last April. V. L. Triplett is manager of the company.

Many Roper Corp. Employes Are Joining Armed Forces

One hundred thirty-six names are already on the "Service Honor Roll" of the Geo. D. Roper Corp., Rockford, Ill.

Among those to join the armed services lately are A. N. Richards, Jr., who represented the company in Oklahoma, Arkansas and Louisiana, and W. G. "Bud" Parks, who is now a 1st lieutenant in army ordnance and stationed at Omaha.

S. W. McGehee, who formerly covered the Kansas-Missouri territory, has a leave of absence till after the war and is working in the Beech Aircraft Corp. in Wichita, Kan.

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Basic Rules Given For Fighting Confined Fires

The Safety Research Institute of New York in issuing directives for Fire Prevention Week of Oct. 4-10 offered a list of rules to be observed in fighting fires in confined spaces. The suggestions, applicable for the entire year, are:

1. Fight the fire from outside the space wherever possible, standing where there is fresh air and discharging the extinguishing agent on the fire through a doorway or other opening.

2. After the fire is out, do not enter the space without respiratory protection until it has been thoroughly ventilated. Some spaces, such as manholes, may have to be ventilated mechanically before they are safe to enter.

3. If a small unventilated space must be entered when a fire is burning in it, or immediately after the fire is extinguished, gas masks must be worn.

Limitation Orders Affect Water Heaters and Jackets

Limitation Order L-185, issued Dec. 19, prohibits the manufacture of gas-fired and oil-fired water heaters except for war housing or other war projects.

However, inventories of finished equipment are large at present and necessary replacements may be had for a considerable time, it is stated.

Limitation Order L-199, issued Dec. 19, also, prohibits the manufacture and installation of metal tank supports, with three minor exceptions, and that of metal tank jackets, with three exceptions. It also prohibits the use of copper or copper base alloy in the manufacture of most plumbing and heating tanks, but permits the use of copper in making repairs to existing non-ferrous tanks as provided in the amended M-9-c and allows the manufacture of repair and replacement parts on the same basis as in 1941.

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Anchor Petroleum Co. Increases LP-Gas Tank Car Fleet

In expanding its operations in the butane and propane fields, Anchor Petroleum Co., of Tulsa, Okla., has announced the addition of a fleet of new railway tank cars. The cars are 225 lbs. working pressure and designed to handle propane, iso- or normal butane and isopentane. They were built by the American Car & Foundry Co.

Increased demand for Anchor-gas has come with war activities, according to information secured from officials, and this has forced increased transport facilities. In addition to tank car service, Anchor is also using its fleet of motor transports for delivery in several Mid-western states.

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Construction Under Way On Houston Rubber Plant

Construction has commenced on Sinclair Rubber, Inc.'s, butadiene plant near the Sinclair Refining Co.'s Houston, Texas, refinery. The plant will have a capacity of approximately 50,000 tons annually.

Polymerization and processing of the butadiene into synthetic rubber will be undertaken by the Goodyear Tire & Rubber Co. in a plant to be constructed and operated under that company's supervision. The styrene component of the buna-S rubber will be supplied from a plant under construction by the Monsanto Chemical Co. at Texas City, Texas.

Production in the new Sinclair Rubber, Inc., plant is scheduled to start about the middle of 1943.

One of the new LP-Gas tank cars which Anchor Petroleum Co. has added to its fleet.

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meets the demands of the nation. Our plant has gone to war for the duration — but when peace comes, L. C. RONEY products for the LP-Gas industry will meet the demands of dealers everywhere. In the meantime—our stock of LP-Gas equipment is still complete.

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L P G Dealers find real profit in BRILLIANT FIRE sales because the product is time-tested, trustworthy. Geared for economy operation and negligible servicing. These popular heat-makers are offered in a variety of styles for every home need.

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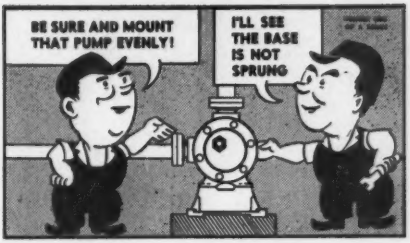

How To Get The Most Work Out Of Your VIKING PUMPS

When mounting a Viking Rotary Pump and bolting it down, be sure that the base is not sprung. Bolting the pump down over an uneven surface may cause binding and heating in the stuffing box. It may cause working parts of the pump to bind and wear beyond repair in a short time. The pump must be free enough to turn the shaft by hand.

Get EXTRA wear out of your Viking Pumps by giving them EXTRA care. The Viking Service Manual tells you how. It's a handy, illustrated booklet giving you practical help in mounting, operating and maintaining Viking Pumps. Write for your copy today. It's FREE.

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

Fractionating Units Aid Aviation Gasoline Process

Plans have been completed and actual construction of additional fractionating units to the Lone Star Gasoline Co.'s plant No. 101, three miles southwest of Ranger, Texas, awaits only the final approval of the WPB. J. R. Jarvis, superintendent of gasoline plants, stated that application for installation of similar units to the Lone Star Gas Co. gasoline plants at Trinidad have been made.

The fractionating units at the Ranger plant will take natural gasoline from Breckenridge and other company plants in the West Texas area and process it into isobutane, normal butane, isopentane, normal pentane and heavier hydrocarbons. Isobutane and isopentane are used for blending with other refinery stocks to make aviation gasoline for 90 and 100 octane grade.

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Plan for Construction of California Rubber Plant

An application for the construction of butadiene and styrene plants in southern California is understood to have been filed with William M. Jeffers, rubber director, Washington, D.C., by Henry J. Kaiser, noted West Coast shipbuilder.

Mr. Kaiser's plan is to use benzol from the coke ovens of the Kaiser steel plant near Fontana, Calif., which is expected to be in operation soon after the New Year. The coke ovens are now being pre-heated with butane. The necessary alcohol could be produced at the local wineries and by the Monarch Brewing Co.

It is claimed that there will be sufficient benzol and alcohol available to produce 10,300,000 lb. of styrene and 34,400,000 lb. of butadiene per year, which would yield approximately 20,000 tons of buna-S rubber.

ADVERTISERS